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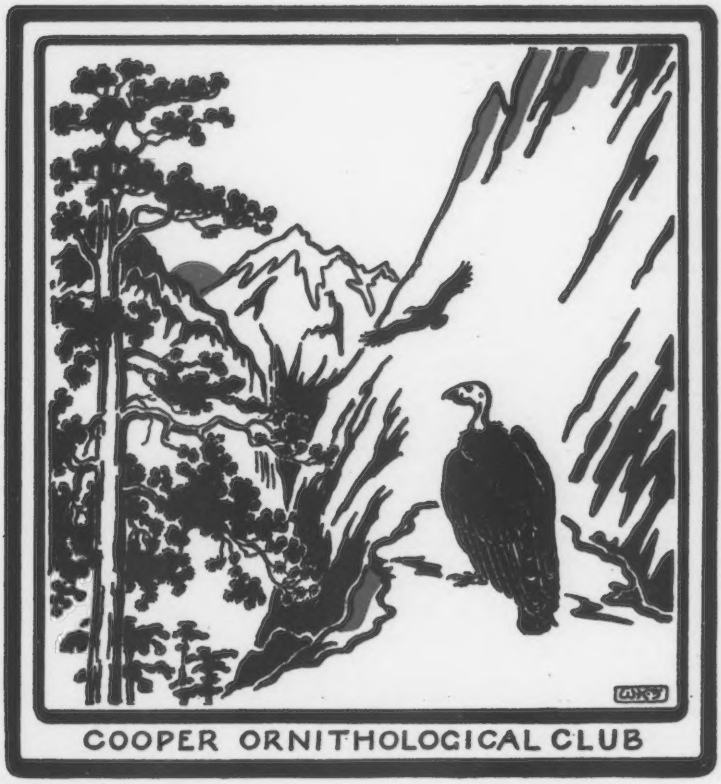
THE CONDOR

A Magazine of Western Ornithology

Volume XL November-December, 1938 Number 6



COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

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Issued November 15, 1938

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THE CONDOR

VOLUME XL NOVEMBER-DECEMBER, 1938 NUMBER 6

DISCOVERY OF THE NEST AND EGGS OF THE TUFTED JAY

WITH FOUR ILLUSTRATIONS

By ROBERT T. MOORE

Ever since the description of the Tufted Jay, *Cyanocorax dickeyi* (Auk, vol. 52, 1935, pp. 274–277), the author has hoped to find the nest of this fascinating new species. In April, 1936, a party was organized to spend two weeks at the type locality, Rancho Batel, southeastern Sinaloa, under the belief that at this period of the year we would find the Tufted Jays nesting. Beside the author and his wife, the party consisted of Mr. and Mrs. Paul G. Austin, Chester C. Lamb, and a Mexican assistant, José. That this undertaking failed to attain its chief objective was not due to any lack of energy. Considerable areas of an exceedingly difficult mountain range, dissected into steep-sided arroyos and one stupendous barranca, were covered by members of the party. Throughout this period only one small flock and three individual jays were observed. Obviously they were just beginning to feel the urge of an approaching mating season. Dissection of the sexual organs indicated that the birds were not breeding and forecasted a nesting season beginning about the middle of May. As it was impossible for the party to remain another month, the undertaking was abandoned.

Early in 1938 it once more became possible to plan a zoological excursion to southeastern Sinaloa, and early January found the author working on the numerous difficulties of obtaining collecting permits, arrangements for assistants and new photographic equipment that was required by the advancing technique in color films. Mr. Arthur Barr of Pasadena was a new acquisition to our increasing and friendly party of bird students. He proved an extremely valuable and indefatigable co-worker in the photographic program, as well as in studies of life habits of the denizens of this mountainous region.

On May 15, 1938, with our old companions, Chester C. Lamb and José, we were heading for Rancho Batel and the exceedingly restricted habitat of the Tufted Jay. Although we had just spent a most eventful week photographing sea birds, secretly we knew we would judge the success of our expedition chiefly by one criterion: would the nest of *Cyanocorax dickeyi* become known to science or not?

By the twenty-first of May, I was sitting on a moss-covered log in a mixed growth of pine and oak on a spectacular mountain range, where it begins to drop steeply to the Pacific Ocean, fifty miles to the west. Epiphytes and parasites covered the moss-festooned branches of the oaks, which arched out and down over the precipitous slope. A cluster of fragrant wine-colored orchids focused my attention on an arm of a mighty oak. Would the Tufted Jay choose such a luxuriant surrounding of moss, tree ferns, bromelias and orchids for its nesting site? Through the arching limbs could be seen the seared slopes of dry brush of the upper Arid Tropical Zone far below, from which crept up along an arroyo to the right a ribbon of heavy tree growth. These trees belonged to a different floral zone than that of the pine-oak association, in which I was sitting. Clearly I was ensconced on the dividing line between two zones. That the world behind me had little to do with the world below was quickly indicated by a two-noted, staccato call from the heavily laden oak limb above. A Chihuahua Ptilogonys (*Ptilogonys cinereus otofuscus*) was seriously objecting to my presence and summoning his duller-colored

mate to discuss the unwonted intrusion. The call note of a Sierra Madre Creeper (*Certhia familiaris albescens*) called attention to a bird near a nest in the cracked bark of a pine tree. To my right a female Hepatic Tanager (*Piranga flava oreophasma*) was examining an oak crotch with great care, seemingly interested in the possibilities of a nest site; and now from the vine-draped growth along the arroyo to the west came the high-pitched, ethereal song of the Jaliscan Solitaire (*Myadestes obscurus occidentalis*) —a series of musical slurs of great range, but of faint and ventriloquistic quality. Surely these birds belonged to the Transition Zone. But only this morning a Chachalaca (*Ortalis vetula*) had made his song, that resembles the creaking of rusty springs, crackle over the brush. And a Blue Mockingbird (*Melanotis caerulescens effuticius*) had touched the zenith of a memorable morning by his full-throated songs from the blackberry brambles.

Would the Tufted Jay choose such a site for its nest or would it prefer the solid pines on the top of the range behind me? Instantly the answer seemed to come to my question. Two gleams of dark blue and white flashed through the great oak. The Tufted Jays had arrived. Greatly different from the mischievous carefree creatures of our April days of 1936, this pair was engrossed in a serious job. They hopped from one clump of orchids to another; they stayed long in a mass of tree ferns, clearly searching for something they could not find. There was no mistaking them. That snow-white tail could belong to no other bird than *Cyanocorax dickeyi*. And then, suddenly, a pair of ptilogonyses became aware of them and fell upon them, like kingbirds upon a hawk. In a moment bedlam was let loose. It seemed as if every bird of the forest had come to the attack; from all quarters they swarmed upon the pair of jays. Solitaires, White-eared Hummingbirds (*Hylocharis leucotis leucotis*), Mexican Thrushes (*Turdus assimilis renominatus*) and several species of flycatchers, felt it incumbent upon them to express their dislike for the intruders. Although the din did not cease until the jays had disappeared along the rim to the northeast, the bedeviled birds paid little attention to their annoyers, except to dodge, when a ptilogonys, more furious than the rest, dived too close for comfort.

While I was waiting for their return, I scanned with my binoculars a thick mass of vines and dark umbrage near the top of the heavy growth by the arroyo to the west. There right before my eyes and not fifty feet away on the moss-decked tree was the crouching form of a Tufted Jay. Its wings were slightly spread as if hovering over a nest! The end of my search seemed to have been reached. But an examination of the tree proved that the peculiar attitude was due to the ferns and orchids in which the bird had crouched. There was an old nest nearby, which might have been used the year before. On return to camp it was learned that Arthur Barr and Chester Lamb had seen eight Tufted Jays near the camp, but had discovered no nests.

Three days past without seeing a single Tufted Jay. The top of the mountain range had been thoroughly gone over for two miles in all directions, and so conspicuous a bird could hardly have escaped observation by three watchful ornithologists. We began to doubt that the birds were nesting in the Transition Zone at the top of the range, or even in the oak-pine association of our camp. Were we too high? My barometer gave the altitude as 5640 feet and the top of the range as 6000 to 6200 feet. Rudolpho had reported that Tufted Jays were more numerous in a region about a day's journey away, or approximately ten miles along the range to the northwest, but he was vague as to the exact locality and type of tree growth. We determined to concentrate our attention on the slopes below us, particularly on the east side of the range where oaks and other high trees were concentrated along water courses.

On May 24, José came in with the calm statement that down on the eastern side, where the Durango and Panuco trails forked, he had seen four Tufted Jays and found two old nests, as well as one which had the appearance of being new. In the afternoon José and I climbed over the range, and soon we were dropping down rapidly on the trail to Durango City. About five hundred feet below the summit, where the pines had ceased entirely, we reached the head of an arroyo, which descended in a northeasterly direction. It made a noticeable depression in the eastern slope of the range. To the right of it was a considerable stand of oak trees, of a totally different character from any we had observed elsewhere. These were seventy-five feet or more in height, the trunks slender, and practically all the branches vertically upright so that the parallel upright shoots formed a flat top. After leading me for a quarter of a mile through the dense forest, José pointed straight upwards. So thick were the limbs and so dark the gloom, that for several minutes I could not locate the nest of sticks at the very top of one of the tallest trees. Then came from an adjoining tree the unmistakable jay call, with which I had become familiar in 1936 (call 1, fig. 61). A moment later a flash of white and dark cyanine blue caught my eye in the top of one of the nearby trees. A glance through my binoculars revealed that a tufted head was cocked sidewise and golden eyes were examining me intently. Soon the mate appeared, and then a third bird, a fourth, a fifth and a sixth. Although they were on the best of terms and obviously interested in each others affairs, a tendency was evident to keep in pairs. José assured me that the sticks had been placed recently and, as if to prove his assertion, one of the jays flew to the tree and gradually hopped up within ten feet of the nest. A terrific crash of thunder interrupted our observations and the jays vanished as suddenly as they had appeared. Soon hail was slashing the oak leaves and the white bullets stung us as we crouched under the slanting trunks of an enormous madroño. During a lull in the storm, José climbed the tree, and within 15 feet of the top gave an exclamation of disgust; the nest was "viejo."

Disappointed, we started for camp up the long slope. Reaching the margin of the oak forest, I was suddenly galvanized by the sight of a jay picking at a twig. A quick glance through the binoculars proved that it was actually seizing bits of twigs and breaking them off. With a half dozen in its bill, it flew to a concealed oak top. Creeping over, I caught sight of a brand new nest far up in the oak, about fifty feet from the ground. The tufted dandy was actually weaving twigs into it. Our excitement was great at finding the first nest and it required real control to leave the vicinity at once in order not to frighten the birds from laying eggs.

No further Tufted Jays were seen until May 28, when in the middle of the afternoon Rudolpho, who had been assiduously hunting them, came in with the roport that he had found a nest. He had seen a bird sitting on it. As he assured me it could be reached in less than two hours, I decided to go at once. It had been a gray day of swirling fog, which had started off inauspiciously. I secretly feared he had mistaken *Cyanocitta* for *Cyanocorax,* the former being present, though rare, in this locality. With enthusiasm renewed, we started straight up the precipitous slope of the range and in a half hour were slipping and winding down the exceedingly steep trail on the other side through a very different type of country. I was confident we were headed for the same arroyo, whose source was close to the first nest we had found on the twenty-fourth. But we veered farther down the mountain side into the lower reaches of the arroyo, where a narrow valley was filled with a luxuriant tree growth. In an hour we were picking our way beneath large trees of various species in a gorge, where deep pools of water were responsible for the rank undergrowth. Out of its depths sprang a magnificent magnolia, thirty feet in height, covered with huge white buds and flowers. They were deliciously fragrant, without the pungent

quality of our eastern magnolias. Still farther down was a cluster of small fern-like palms, perhaps fifteen feet in height, grouped on a mossy bank. A warning finger from Rudolpho stopped us short. Instantly my eyes caught sight of a bulky nest of sticks in a tall tree, which bore a faint resemblance to an eastern elm. Its top was twenty feet higher than our location on the side of the little gorge, but its roots were thirty feet below us near one of the pools, and the nest was placed in the very top of this tree. I confess that a thrill of excitement went up my spine when I noted through my binoculars the familiar erect crest of separated tufts and the chrome yellow eyes looking dreamily over the side, apparently unconscious of our arrival. A slight slip of my foot brought the bird to instant alertness. Here was the vibrant personality I had become acquainted with in 1936. As she remained at her post of duty, vigilant but poised, we relaxed and enjoyed the rare sight.

When I rose to determine the best way of photographing her, she did not instantly fly, but eventually disappeared quietly up the gorge, where she was later joined by her mate. The birds were very quiet at first, and even later, when conscious we had discovered their nest, they did not give way to raucous outcries, characteristic of most jays. In fact their loudest call (call no. 1) was given only once during the three days of our acquaintance with this particular pair. This call has a rather harsh staccato quality, but the most common call has a much higher pitch and sharper quality, the notes repeated rapidly (call 2, fig. 61). Four other call phrases were heard, either from this pair or others discovered later. No. 3 is an alarm note of clucking quality, which is given more than any others. No. 4 possesses a peculiar, plaintive quality, not scolding but rather conveying a sense of uneasiness. Calls 4 and 5 were the only ones whose notes were not sharply staccato. The accents, which are given in the notation, were conspicuous. No. 5 was a very musical and low-pitched call, and 6 was a longer version of no. 3. With all these varied expressions, the Tufted Jay cannot be classed as a noisy protester. It is decidedly concerned about its nest and will brave almost any danger to voice its objection to intrusion upon its privacy.

Fig. 61. Call notes of the Tufted Jay (*Cyanocorax dickeyi*).

The nest is large, the size of a crow's nest. Made of sticks, its lining, as we learned later, consists of fine and much twisted rootlets. Approximately two feet in diameter, it was not placed in a solid crotch, but woven among the slender branches of the very top of the tree. Clearly it was impossible to get within ten feet of it by direct climbing, without danger of breaking either the eggs or the limbs of the climber. The main trunk of the tree sloped horizontally across the gorge and the trunk on which the nest was

built was merely one of the side branches which grew straight into the air. By following the main trunk about thirty-five feet it was possible to reach the upright column of another tree and thereby climb above the nest for a view into it. I shall never forget my first sight of the four eggs partly hidden by the leaves of the branches.

Still another tree was used as a support for a blind, from which we photographed the nest on the following day. This tree was a real giant, perfectly straight, seventy feet in height, with a large crotch immediately opposite the nest and not more than twelve

Fig. 62. Tufted Jay at nest; Rancho Batel, Sinaloa, Mexico.
Photograph taken by Arthur Barr.

feet away from it. For two days Arthur Barr and I photographed in three-hour shifts from the blind in the top of this tree. On the last day I tied the limbs of the two trees together tightly, swaying them toward each other, in order to make it possible to swing out on a loop of webbing and secure the eggs.

The inside measurements of the nest, which was brought back to the United States in good condition, are six and a half by five inches, and the bottom is deeply cupped, being three inches deep. If it had not been for this ample depth, the eggs could never have been secured by the dangerous "tipping" process which was employed.

Although only four eggs were noted on May 28, another egg must have been laid that night, because five were observed on the next day. This seems to be the normal clutch, as five young were found in another nest on May 31. The eggs measure in millimeters: 37.1×25.4, 36.0×24.4, 36.4×24.8, 35.9×24.4, 38.2×24.0. When fresh, they possessed a slightly bluish olive-white ground color, which rapidly faded to pale olive-buff. Rounded at both ends, they are spotted with Sayal brown and bister, and obscurely blotched with lavender gray. Spots and blotches are scattered all over the egg, somewhat less on the sharper end, and the coloration is very uniform.

The habits about the nest proved to be more than usually interesting. Not only were both birds extremely courageous, one occupying the nest within a half hour after the noisy building of a ground blind on the bluff not twenty feet away, but both birds came together and actually squeezed into the nest, sitting on the eggs side by side, so that their crests were parallel. In about three minutes one of them seemed to get uncomfortable and was finally squeezed out of the nest by the other bird, so that the ejected one was forced to sit on the rim, where it remained for a long time. Unfortunately, from our position on the ground, we could obtain pictures only of the latter bird, which we assumed was the male. A few minutes later he retired to a limb five inches away from the nest and clucked to the supposed female. When they were side by side on the eggs, I distinctly saw one bird caress the bill of the other.

Even more remarkable, was the fact that a third bird flew up to within five feet of the nest while the first two were on it. This bird's presence did not seem to be resented by either member of the pair. In this connection, Arthur Barr, while occupying the tree-blind alone on the following day, observed an interesting incident. He has permitted me to quote from his notes:

"While the female sat on the eggs, the male was perched less than twenty feet from the nest, making up to another bird. They gently picked at each other's feathers and

Fig. 63. Tufted Jay incubating.

Photograph taken by Arthur Barr.

seemed to concentrate on the head. It appeared as love making and was accompanied by low clucking sounds. After a while the new bird flew down the canyon and the male followed. . . . I jerked the rope and she [the bird of the nest] flew away down the canyon. About fifteen minutes elapsed before she returned, and the male was with her. They both went to the nest and, when the female was settled down, he left and, as he flew down the canyon, the third bird left a tree across the canyon and flew with him." It

is conceivable that this may be a case of "mutual helpfulness" such as Skutch (Auk, vol. 52, 1935, pp. 261–265) has described in *Psilorhinus mexicanus cyanogenys*, but if so, we did not see the complete picture.

The mated birds seldom stayed away from the nest more than a half hour at a time and, when they arrived, promptly went on to the eggs. In fact, one bird, presumably the female, often flew straight to the nest from a long distance, landing on its edge, without first perching on a single intervening limb. Occasionally she would appear on a tree some thirty feet away and peer around a branch at the blind, each time swaying her beautiful body and neck in the most graceful attitude imaginable. Always conspicuous because of the large immaculate white tail, her blue wings and upper parts, almost black crest and white facial marks made her an outstanding object. Even when I built the blind on May 30 at the top of an adjoining tree, not over twelve feet away from the nest, the noisy preparation did not frighten her severely and she was back in a half hour sitting on the eggs. When once comfortably settled down, she could not be moved by ordinary methods, such as calling or even by shaking the blind. It was invariably necessary to shout to some assistant on the ground and have him throw a stick toward the nest.

On May 31 Rudolpho and I started for a new nest, which he claimed to have found about a mile away from nest no. 2. It proved to be located in the same grove where nest 1 was found, and only about a hundred yards from it. Although the bird was actually sitting on the nest, so thick was the foliage about it and so high was it placed in the tree, that I could not see any portion of the bird with binoculars. Nevertheless, when the tree was shaken, the parent left the nest. Although in the same large grove of the peculiar straight oaks, this tree belonged to a different species which I could not identify. Like all the others, the nest was in the very top of the tree and the branches were so small that climbing through them would have been exceedingly dangerous. I reached a point fifty feet above the ground, fastened a rope to the trunk and then, with the other end of the rope attached to my belt, hitched up a tall pine tree nearby. There was not a good limb for fifty feet and the ascent without climbers or belt proved arduous. Reaching a good limb fifty feet from the ground, I rested and was able to pull the nesting tree toward me and discover five young birds in the nest. The young were about three days old and without feathers. They gave a slightly nasal call and raised their heads for food when I lifted them out of the nest. We did not put the blind in the pine tree until June 3, by which time the rectrices were already beginning to develop, being nearly an inch in length and showing a distinct blue color. Therefore, the length of these feathers was attained in four days of growth.

During the entire operation of putting the blind in the pine tree, one of the jays, presumably the female, stayed directly overhead in the tree, often not more than three feet away. Scolding constantly, but in a rather subdued tone, she seemed intensely curious about the house that was going up within ten feet of her own. Not once would she go to the nest. As she knew all about the intimate details of the blind, it seemed foolish to put a ceiling on it. Consequently, when the sides were draped around and I was permanently seated on the tiny piece of board near the crotch, I assumed the bird would eventually go to its nest and feed the young. She had no intention of doing this, for in a half hour's time a flutter was heard and she appeared directly above my head, and with a "ca-ca-ca" announced that she had discovered me and was not to be fooled. I tore off the bottom of the draping of the blind and pieced together a ceiling. In an hour's time she was back and trying to look through the crevices. Not satisfied, she actually sat on the edge of the cloth and pulled at it, trying to peek through the interstices.

Eventually, about an hour later, she went to the nest and fed the young. After starting my moving picture camera, I tried to stop it at the end of five feet, but the button was caught so that it kept on whirring. Looking up, I was astounded to see two jays within the field of my camera, one on each side of the nest and each one feeding a young bird. In spite of the foggy atmosphere, the photograph came out better than I could have expected and is a moving testimony, not only to the boldness, but to the devotion of these remarkable parents.

Rudolpho brought in two young jays about four weeks old on May 29, stating that he had secured them out of a flock of eight, which were flying about the trees, a day's journey to the north of us along the ridge. Further questioning indicated that they

Fig. 64. Nest and eggs of the Tufted Jay.

Photograph taken by Arthur Barr.

probably belonged to two separate groups of four young each. One of them died the same night, but the second is still living (June 25, 1938). As this is the first immature bird that has been secured, a description will not be out of place. Resembling the adult birds in most particulars, it differs in having the rectrices almost entirely white, with the exception of the median pair which is blue at the base for a half inch. The white patch over the eye is missing, being replaced by black; and the large white patch below the eye is replaced by black and blue, the posterior portion being black, and the malar region bluish-black in one of the young and cyanine blue in the other. The most remarkable difference appears in the crest. The conspicuous and long black tufts of the adult are replaced by short stubby tufts, the forepart of these being very stiff as in the adult. The middle crest on the top of the crown is also black and softer, but is so short that it does not extend very far behind the eye. The young bird can move this black crest slightly, but cannot depress it. It has much more power over the white feathers on the extreme posterior part of the head, which it can raise into a conspicuous crest, or lay

completely flat. It moves them frequently. I never saw the adult birds move this white portion on the posterior part of the head, nor did I ever see them raise or lower the tufts of the black crest. I am convinced that it is a permanently erect crest, although it may be moved slightly.

The food is greatly varied. In April of 1936 a stomach was examined and was found to be completely filled with broken pieces of kernels of acorns, none of them more than a quarter of an inch square. In May and June of 1938, such food was difficult to obtain. The Indians state that at such times these birds not only feed on the larvæ and the sweet combs of wasps' nests, but also devour quantities of wild blackberries which are found in every open place on the range. The immature bird seemed to like blackberry juice and was exceedingly fond of insects, wood worms and grubs. It was most avid for the larvæ and eggs of a wasp's nest, which I secured. It could be persuaded to pick at the kernels of canned corn, but it soon tired of this food. This young bird has proved an interesting and extraordinarily intelligent pet.

The fact that birds, four weeks old, were found on the same date that fresh eggs were taken, proves that the nesting season is a long one and probably lasts from the middle of April to June 15. A number of old nests and a total of four occupied nests were found by the expedition. One of them was discovered by Rudolpho high up on the shoulders of Aguila Peak, a mountain mass that rose at least 500 feet higher than our part of the range and which was situated almost due east of us. Although it contained eggs the day Rudolpho found it, they had disappeared on the following day when I went with him to the nest.

It should be noted here that the plate (Auk, vol. 52, 1935, opposite p. 274) accompanying the original description of this jay is incorrect in one detail. At that time the color of the eyes was not known and was assumed to be brown. After the article was published, a jay was secured at Rancho Batel and its eyes proved to be chrome yellow, having a very beautiful metallic golden effect. Eyes of some specimens have not quite so rich a yellow.

It cannot be said that the habitat of this jay is very extensive. Only at one place other than Rancho Batel has Chester Lamb, or any member of our expeditions, taken it, and that was near the headwaters of the Presidio River, a region about twenty-five miles northeast of Rancho Batel. Another specimen has been secured recently in the same general area and is now in the collection of the Academy of Natural Sciences, Philadelphia. This jay will be found without question in other localities, probably to the east in Durango.

California Institute of Technology, Pasadena, California, June 25, 1938.

OCEAN WAIFS AND WHAT THEY MEAN FOR DISTRIBUTION

By JOSEPH GRINNELL

When an ornithologist becomes interested in distributional studies, and gets very far with accumulating data, he begins to realize that records of occurrence cannot be rated on any uniform scale of significance. He encounters difficulties in the appraisal of records according to the circumstances of discovery or capture. Difficulties of almost any nature of course make the game fascinating, but also they demand more searching attention.

In my own long-time project of cataloging and examining the records of birds in California, I have come recently to give special consideration to that category which concerns birds reported from the ocean shore of the state, found cast up there, as a rule during or soon after winter storms.

Just now, I have been working with the alcids, a family of sea-fowl which is restricted to the northern hemisphere and which, in numbers at least of species, centers in the north Pacific. No less than eleven of these species are known from Californian waters, or at least have been recorded from these waters. These will be recalled as including the murres, guillemots, murrelets, auklets and puffins. It is the manner of occurrence of one of these species, the Horned Puffin, *Fratercula corniculata*, to which I wish now to call attention. Its known breeding stations extend south from Kotzebue Sound, on the Arctic coast of Alaska, through Bering Sea, and, on the American side of the Pacific, as far as Forrester Island, extreme southeastern Alaska. To the southward, in the waters of British Columbia, Washington, and Oregon, there is but one published record of occurrence known to me, until California is reached, for which state there are several.

Let us now, then, review, scrutinize, and try to find the meanings of, the records to date of the Horned Puffin for California. Considering these records, not chronologically, but from north to south, the occurrences are as follows:

In 1919, Franklin J. Smith (Condor, vol. 21, 1919, p. 128) found four Horned Puffins dead on the ocean beach at Samoa, across Humboldt Bay from Eureka. Two dates were represented, a week apart, February 16 and 23, and a circumstance noted was a recent "violent storm at sea." One of the birds found, and the original label of which corroborates these data, is now no. 30686, Mus. Vert. Zool. It was fresh enough to be sexed (as a male). The skin is clean-plumaged; there is a small "horn" above each eye; the bill shows some development toward the nuptial condition; but the cheeks are still gray. In a letter, Smith stated that some of the puffins found (Tufted Puffins in larger proportion were also represented among the bird remains on the beach) were more or less decomposed.

The next southward occurrence, and one not heretofore recorded, is of a bird found by Vincent Mowbray and Morgan Harris, dead on the outer beach one-half mile south of Fleishhacker Park, San Francisco, January 22, 1933. It was fresh enough to sex (a female) and to save as a skin (no. 62756, Mus. Vert. Zool.). The plumage is clean, free from tar, fairly fresh, unbleached. The bill is, seemingly, in first-winter condition.

Then we have a group of birds recorded by Harold C. Bryant (Condor, vol. 21, 1919, p. 239) from the ocean shore of San Mateo County, all in 1919. The first, a bird still alive but unable to fly, photographed, then released, was found near Mussel Rock on March 2. On Montara Beach, on May 24, Mrs. Amelia S. Allen, among other bird remains more or less oil-soaked in the drift, found those of two Horned Puffins. One

was brought to the Museum of Vertebrate Zoology, where it is saved as a skeleton (no. 30714). On May 17, at Coast Ways, near Pescadero, a bird was found by someone else and forwarded to the same museum; even though partly dried and decayed, it was saved as a skin (no. 30713). It was badly oil-soaked. Both these May-taken birds must have been dead a long time. The skin is in winter condition of plumage; the bill retains only that segment of the otherwise moltable bill-sheath that pertains to the end of the upper mandible. I judge this bird to have been of age two years or older.

On the ocean beach four miles north of Santa Cruz, Santa Cruz County, on August 25, 1929, Leslie Hawkins found the dried remains of a Horned Puffin. He saved the head for identification, and this has become specimen number 54004 in the Museum of Vertebrate Zoology, hitherto unreported. This bird exhibited winter plumage, with bill-sheaths of immature size developed on ends of both upper and lower mandibles.

At Pacific Grove, Monterey County, on February 17, 1914, a Horned Puffin was "collected" by Henry W. Marsden. This became no. 26172 in the L. B. Bishop collection (see Bishop, Condor, vol. 16, 1914, p. 204, and *idem*, vol. 17, 1915, p. 185). No details are known as to exactly how the bird was obtained. It was gotten nine days before Marsden's death, so was probably from a near-by beach. It was fresh enough to sex (as a female), and Dr. Bishop writes that it was "in winter plumage including the bill."

And finally, on the beach three miles north of La Jolla, San Diego County, on February 25, 1933, the well dried-out body of a Horned Puffin was found. Preserved as a "mummy," it became specimen number 16183 in the collection of the San Diego Society of Natural History (Huey, Condor, vol. 35, 1933, p. 233). This is the southernmost "record" to date.

To summarize, 12 individual Horned Puffins or their more or less disintegrated remains are on record from the coast of California. Of these, 10 were dead when found; some of them had been so a long time. One was alive but unable to fly; and one may have been alive, though its condition when discovered is not definitely known. The Horned Puffin is an open-sea forager. It may be assumed that all 12 birds had come to the sea-beach unwillingly; that is to say, each was unable to fly, or else it would have stayed out where conditions of food and safety for its kind were optimum.

While there is no doubt that oil on the water, of artificial, that is, human caused, origin, has in the most recent period of years directly brought high mortality to certain sea birds, we must grant as always normal a certain death rate, resulting in birds dead or in dying condition being swept continually shoreward. Back in the '60's, before any development of the oil industry, Cooper recorded unusual species on our coast, from their remains as found by him or friends of his on the beaches of this state. Avian jetsam is nothing new.

The prevailing winds with us are westerly; and the surface currents of the ocean, taking the entire coast into account, are southerly. In my early days, when I taught physical geography, it was the "Japan Current" that swept southward off the shores of western North America, the idea being that it originated somewhere over on the Asiatic side of the North Pacific, flowing north, then east, then south, circuitously. It seems, now, that any such source and course is unlikely, and our Pacific-side current has come to be called the California Current.

Dr. Harald U. Sverdrup, Director of the Scripps Institution of Oceanography, at La Jolla, tells me that, speaking in general terms, "the average southward drift of surface water off the coast of California is 10 to 30 miles in 24 hours." Let us say, then, that a floating object, nearly submerged, would be carried southward at the rate of 20

miles per day; in 40 days it could conceivably have gone the 800 miles, over the northwest-to-southeast course of the California Current from the Oregon line to a place off La Jolla.

But there are factors affecting a floating object beside this general movement of the water. There are reverse eddies in it, an especially noteworthy one south of Point Concepcion which would more or less delay the southward rate of an object that eventually might reach, say, the beach at La Jolla.

Then as to the winds, the prevailing direction of these along the entire California coast is from the west. But the strongest winds, those reaching gale velocity, are from the northwest and from the south. The latter would retard the object, the former accelerate its movement. Significantly, the northwest winds are dominant in the late-winter-to-spring period of the year, wherein, it will have been noted, all our Horned Puffin records fall. To review this matter, the dates for relatively "fresh" dead birds, and ones yet alive or possibly alive, ranged from January 22 to March 2. The specimens of May and August take were more or less dried up or decayed, and moreover the ones examined for this point were in winter plumage.

A water-logged bird body will undoubtedly be less affected by wind than a bird in good condition of plumage, riding high and dry, though it must be admitted that an alcid does not ride the waves as buoyantly as, say, a gull. Furthermore, its manner of feeding carries it beneath the surface, then more affected by the current of the water rather than of the air. A bird, alive but incapacitated for flying and therefore for recovering latitude, would be at the mercy of both elements and would drift to its fate as a result of the component of forces.

As to how long a puffin, even seriously debilitated from injury, disease, or old age, could survive, we can only guess—many weeks perhaps. The onset of a condition of complete helplessness might be very slow, involving months. The distance from the waters around Forrester Island, Alaska, to La Jolla, California, taking extreme points, is roughly 1800 miles. Let us add one-third, for local counter-currents, possible dominant influence, at times, of southerly gales, and other factors unknown, giving a total distance for drift, of 2400 miles. At 20 miles per day, 120 days would be used for the longest journey in the water. Subtract four months from the earliest date of recorded appearance in California, January 22, and we have September 22—about the time within the known regular habitat of the species when autumn storms come on and birds below par in vigor would be winnowed out of the resident population, literally to be cast adrift.

In this connection, the Fourth Edition of the A.O.U. Check-list says of the Horned Puffin, "Winters from the Aleutian and Commander islands south to . . . California (Pacific Grove)." I can find no record of any able-bodied bird for British Columbia (save for Masset which is only some 50 miles south of the breeding colony on Forrester Island), Washington, or Oregon. It would appear that the one California record cited was the only bit of evidence to warrant the implication that the Horned Puffin is migratory south of its southernmost breeding ground; and this implication the evidence now assembled makes seem unwarranted. At the far north, in Bering Sea and in the Arctic Ocean immediately north of Bering Sea, there may well be, as stated by Nelson, a southward drift of the population there, as forced by the winter ice pack. But this movement may be interpreted as not exactly a seasonal migration, but rather a local shift of population comparable, say, to the movement, down here, of California Gulls from lakes of the Great Basin westward to the seacoast for the winter.

Now, if the southward drift of coastal waters is responsible for the occurrence on our coast, as now seems likely, of such non-migratory sea-fowl as the Horned Puffin, what

status shall we accord our records of them? My own present inclination is to appraise them as adventitious—accidental in the true sense of that word, to be classed along with occurrences due to man's own transportation of birds from place to place. Such occurrences should, it seems to me, weigh not at all in defining the normal geographic ranges of the species, winter ones *or* summer ones. Inferences as to the factors of distributional limitation for such species will be drawn after such adventitious records have been carefully appraised as such, and excluded from consideration.

Museum of Vertebrate Zoology, University of California, March 17, 1938.

NOTE.—After the above article was written I solicited, and received, information concerning manner of southward occurrence of Horned Puffins, which is much worth giving space for recording, in this supplementary note. Major Allan Brooks, under date April 3, 1938, writes me:

"As far as I know, the Masset record of the Horned Puffin is the only one for British Columbia; but this proves little, as the shore line is so little worked. The species does not come 'inside,' that is, into the waters between Vancouver Island and the mainland, as far as I know. During two seasons' work on the north end of the Queen Charlotte Islands I saw nothing of the species, although Forrester Island was in sight. But it has been picked up on the beach in Washington a good number of times and also, I believe, in Oregon. I have one specimen picked up by E. A. Kitchin at Westport, Grays Harbor, Washington, January 29, 1933."

Mr. Stanley G. Jewett, under date March 29, 1938, furnishes facts as follows:

"On March 7, 1936, I found two Horned Puffins dead on the beach at Netarts Bay, Oregon. These were badly decomposed but I saved the head of one which now is no. 3903 in my collection. During the early winter of 1932, and at least until February, 1933, a large number of these birds drifted in on the Oregon beaches. During five days spent on the beach, namely, January 13, 14, 15, and February 4, 1933, I saw at least one hundred on the beaches of Tillamook and Lincoln counties. A number of the specimens were preserved and ten of them are now in my collection, nos. 7582-91. During a conversation with Frank A. DuFresne of Juneau, Alaska, he told me that while he was crossing the Gulf of Alaska during October, 1934, thousands of Horned Puffins and other sea birds were seen dead on the surface of the Gulf."

Dr. Hildegarde Howard writes me of yet another, previously unrecorded specimen of *Fratercula corniculata* from California. This is number Bi661 in the bird skeleton collection of the Los Angeles Museum, obtained by Leigh Marian Larson and Edna Fisher on the beach at Del Monte, Monterey County, February 22, 1929.

It will be observed that the supplementary information just given in no essential degree changes the trend of significance as apparent in the main article. However, when this paper of mine was read at the annual meeting of the Cooper Ornithological Club, in Fresno, April 16, 1938, ensuing discussion from the floor produced some considerations of import. Mr. George Willett stated that from his field experience in southeastern Alaska, he knew of no midwinter record for the Horned Puffin in those waters; the birds summering there either went south or went far out to sea. He, Dr. Loye Miller, and other speakers, thought there was still a good chance of off-shore southward migration to some oceanic area, even as far as the latitude of southern California, which has not yet been searched out by any ornithologist, and from which our "waifs" may be swept shoreward by the westerly winds. Grantedly, the evidence as it stands now in the light of this theory is somewhat equivocal.—*J. Grinnell, April 24, 1938.*

THE SIGNIFICANCE OF COMBAT IN MALE ROSY FINCHES

By HOWARD TWINING

In recent ornithological literature a great deal of emphasis has been placed on the territorial behavior of birds. As a result, the "territory conscious" observer is apt to assume that any bird under observation possesses some sort of territory, and to try, in the course of his study, to prove that the territory exists by analyzing certain features of the bird's behavior. In the course of a study of the Sierra Nevada Rosy Finch (*Leucosticte tephrocotis dawsoni*) in Virginia Canyon, near the crest of the Sierra Nevada in Yosemite National Park, California, I found how easy it was to be misled by such a procedure.

In the period when most female rosy finches are engaged in building, the males fly from rock to rock, vigorously chirping, and pursuing other males. It might appear at first that these birds are defending a nesting territory against invaders who might be trying to steal the nest or the nest site, but after many observations it is found that a single male may chirp and pursue other males at different times and in different places. When the pursuits are found to extend to the feeding grounds, it becomes obvious that some stimulus other than the concern for a nesting territory is responsible for this belligerency.

The males seem to commence sexual activity before the females. As the sexual urge develops, the *cheur* call of the males is heard more and more, and is most evident on the nesting cliffs. A rough census of the rosy finch population of the cliffs on the west side of Virginia Canyon on June 16, 1936, showed that there were about five males to each female. The males on the cliffs during this period seemed to spend most of their time flying from point to point and chirping.

Any female, regardless of whether she is already mated, or has a nest or eggs, usually is met by some unattached male as soon as she reaches the nesting cliffs. A brooding female which leaves the nest for a few minutes to feed on the seeds of a composite nearby usually will be accompanied by some male which has been chirping from a part of the cliff within sight. He will follow her as she flies back toward the nest, but will leave as soon as she settles on the eggs.

On June 18, 1937, a female that alighted on the lower part of a cliff was immediately surrounded by five males that flew in from all sides. They stayed with her for three or four minutes, without fighting among themselves, then the whole group disappeared over the ridge of the north pinnacle. Similar groups were not infrequently seen in this period.

When a mated pair is present, the scene is different. A female that has not yet started incubation usually is accompanied by her mate while she is in the vicinity of the nesting cliffs. Any male rosy finch that approaches the female is pursued by her mate until he is driven away a hundred feet or more. When not pursuing, the male flies from point to point near the female, always alert, and constantly chirping. The pursuits vary from short sallies to fend off a passing bird, to breast-to-breast battles in which beaks and claws are used by both combatants.

Between 9:30 and 10:30 a.m. on June 19, 1937, a male was averaging one pursuit every five minutes in the vicinity of a nest on the west cliffs of Virginia Canyon. At 9:45 a.m. the female flew to the nest with material, arranged it, then flew to the cliffs opposite, followed by her mate. A second male flew down from above and alighted next to her. The mate drove him down the cliff. A third male flew down and alighted next to the female in the absence of the other two. The returning defender flew back and attacked him, but was followed by the vanquished male. The defending male flew back and forth trying to drive off the two, and finally succeeded.

Most pursuits consist of short twisting flights in which the intruder is routed without bodily contact. A bird swoops toward the female, is met in mid-air by the mate, and the two whirl off into space. A few seconds later the male is back near the female, chirping.

Some pursuits turn into hard fought battles in which it is impossible to tell whether the mate is replaced by another bird. One battle involving the above mentioned pair, consisted of a breast-to-breast fight in the air extending a hundred yards down the cliff face. Near the base of the cliff the birds interlocked and fell onto a snow patch. They rolled into a crack between the snow and rock and did not emerge for about fifteen seconds. Both birds were exhausted when they appeared. The fight continued on the surface of the snow, both birds too weak to fly. After thirty seconds of this fighting, one bird glided off, pursued by the other.

A fight between two males never occurs unless a female is close by. While the female is searching for a nest site or building the nest most of the fights of course occur in the vicinity of the nest; thus often there is a false appearance of defense of nest territory. When the fights continue around the female as she is collecting nest materials at some distance from the nest, and even when the pair is foraging in timberline meadows a half mile away from the nest, it can be seen that the "territory" of the male rosy finch is a certain area around the female. The "territory" moves as the female moves.

The fights indicate that a female may change mates even after the nest is started. They also explain why the male accompanies the female while she is searching for a nest site. However, the fact that a single male acts as the guardian of the female over a period of time shows that there has been established a psychological distinction between the mate and the suitor. The mate defends or attacks, the suitor merely solicits. The suitor usually cannot resist the attacks of the mate and is not inspired to drive off other suitors. There is no indication that the female has anything to do with the creation of this distinction. She seems to be wholly unconcerned with the activities of the males at this time.

The defensive actions of the mated male continue until the female commences incubating. He then takes over the duty of feeding his mate on the nest and evidently becomes entirely unconcerned over the presence of other males. Indeed, he may have difficulty in approaching his own nest if another pair commences building in the vicinity.

These few descriptions show that the Sierra Nevada Rosy Finch has no fixed territory. Defense reactions are evoked from the mated male only when another male approaches his mate. Rosy finches feed peaceably in flocks on the feeding grounds except when a mated pair is present, whereupon other males are driven away. A building female is seldom unaccompanied, and is always defended from all other males by her mate.

Oakland, California, August 15, 1938.

THE PTERYLOSIS OF THE CALIFORNIA CONDOR

WITH FIVE ILLUSTRATIONS

By ALDEN H. MILLER and HARVEY I. FISHER

The vultures of the New World show their distinctness from other diurnal birds of prey in a number of ways. Recently, their pterylosis has been compared with that of other falconiforms by Compton (Univ. Calif. Publ. Zool., vol. 42, 1938, pp. 173–212). He showed that the feather arrangement in the Falconiformes falls naturally into three types, known as the accipitrid, falconid, and cathartid patterns. Of the species which he dissected, the Turkey Vulture (*Cathartes aura*) and the Osprey (*Pandion haliaetus*) showed the cathartid arrangement. This led to the conclusion that the Osprey belongs to the suborder Cathartae. Manifestly it is desirable to determine how uniform the pterylosis may be among the New World vultures (family Cathartidae) and to test the applicability of Compton's definition of the cathartid type.

The opportunity to study the feather tracts of the California Condor (*Gymnogyps californianus*) came about through the efforts of Mr. J. R. Pemberton and Mr. Perry Sprague. On January 1, 1937, Mr. Sprague came upon an adult condor that was gorged with food, unable to fly, and apparently sick. This was on the Tejon Ranch east of Bakersfield. The bird was taken to ranch headquarters and fed upon meat and squirrels, but it disgorged everything it ate and became weaker. Finally it died on January 10, the nature of its infirmity as yet undetermined. Mr. Pemberton learned of its death and took immediate steps to send the bird to the Museum of Vertebrate Zoology at Berkeley. Upon its arrival it was embalmed, thus assuring a chance to study the anatomy of this vanishing species. We are greatly indebted to Mr. Pemberton and Mr. Sprague for the essential parts they played in making this study possible and for the opportunities for further investigations that lie before us.

To facilitate reference to Compton's work, we follow his nomenclature and plan of description. At the end of the discussion of each feather tract is a summarized comparison of *Gymnogyps* and *Cathartes*. Doubtful points relative to the pterylosis of *Cathartes* have been rechecked by examination of alcoholic specimens.

Capital tract.—The head feathering, though much reduced, is unequally developed in different regions. There is a transverse band of small plumaceous feathers, 6–12 mm. long, that occupies the frontal, anterior superciliary, and loral regions. The frontal and rostral regions are well feathered from slightly in front of the nostril to the level of the posterior margin of the eye along the median line. Laterally, the feathered area is restricted and sparser, passing ventrally as a band between the eye and the nostril to merge with the loral region. In parts of the frontal region the feathers almost completely obscure the skin. The feathers of the rostrum are arranged in a whorl which centers between the anterior ends of the nostrils.

The feathers of the loral region are directed posterodorsally in the upper section near the eye, but posteroventrally in the lower section. The loral region is connected at its ventral margin with another, triangular area beneath the eye. This latter is occupied by more reduced feathers, 4–5 mm. in length, intermediate between those of the loral region and the vestigial hair-like feathers of the other parts of the head. This area below the eye occupies part of the anterior auricular region and the upper margin of the malar area (see Compton, *op. cit.*, fig. 1, p. 181).

The posterior auricular region consists of a ring of fairly heavy bristles about the meatus, not directly connected with the anterior auricular area. The ring is well developed anteriorly and dorsally.

The coronal region is bare except for two patches of weak bristles, about 2 mm. in length, on either side near its posterior boundary. These are separate from the occipital, postauricular and submalar regions. The similar, sparse bristles of these latter regions form a continuous zone that meets the anterior and posterior auricular regions. The interramal and ocular regions are entirely bare.

Compared with *Cathartes aura*, the capital tract is less uniformly feathered. In both, the loral region is relatively well feathered, but no feathers are plumaceous in *Cathartes*. *Gymnogyps* lacks eyelashes and many other parts are entirely naked (fig. 65). In *Cathartes* only the normal apteria about the eye, the anterior interramal region and the rostrum are bare, and the vestigial feathers of other areas are less widely spaced.

In the reduction of head covering in the Condor, the boundaries of regions that commonly are recognized in pterylography have been transgressed. Some new delineations have appeared. However, the auricular ring and the loral region preserve an arrangement typical of falconiforms with normal head plumage.

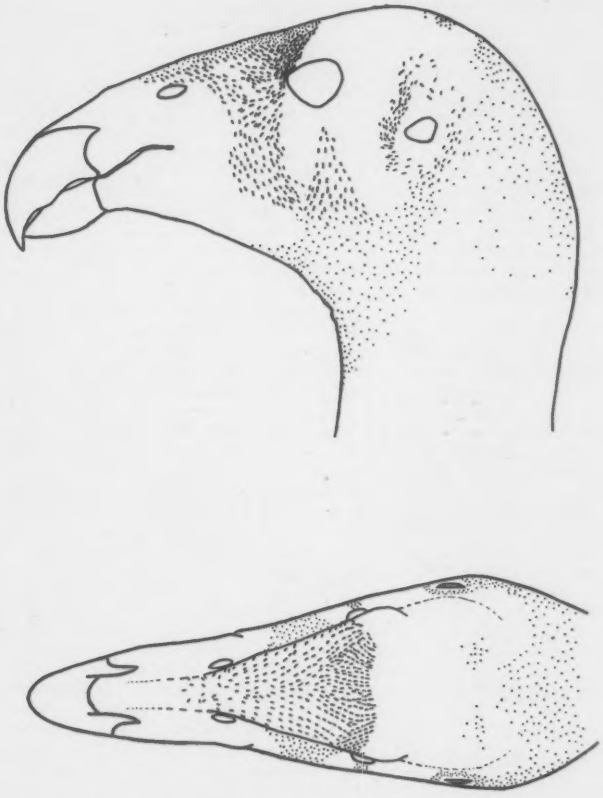

Fig. 65. Drawings of lateral and dorsal surfaces of head of California Condor, approximately x ½, showing distribution of feathers.

Spinal tract.—The anterior dorsal cervical region is sparsely feathered with vestigial bristles. Dense feathering begins abruptly and forms a ruff whose margin slants posterolaterally from a dorsal anterior apex. The skin for 5 cm. behind the apex is covered with lanceolate feathers. These feathers are set in a whorl with the center on the middorsal line about 4 cm. from the apex. Thus, the lanceolate feathers of the ruff project forward and laterally over the essentially bare neck. Behind the ruff the feathers in the dorsal cervical region are closely set, and increase gradually in length posteriorly. A short distance in front of the shoulder a narrow lateral cervical apterium appears that separates the humeral and ventral cervical areas from the dorsal cervical region.

The interscapular region is continuous with the dorsal cervical region; there is no abrupt change in feather type. At the level of the anterior margin of the shoulder a small median apterium is discernible; it remains narrow posteriorly. The largest feathers of the interscapular region occur in the central posterior section of the region on each side. Each division narrows posteriorly. The

rows of feathers are irregular and the two sides of the region unequal in total number of feathers. Similar irregularity and asymmetry are apparent on many regions of the body. There is no lateral scapular region.

The dorsal region consists of irregularly placed feathers, one or two on either side of the midline at any given level. These are distinctly smaller than those of the interscapular area, but blend with those of the pelvic region which is continuous posteriorly.

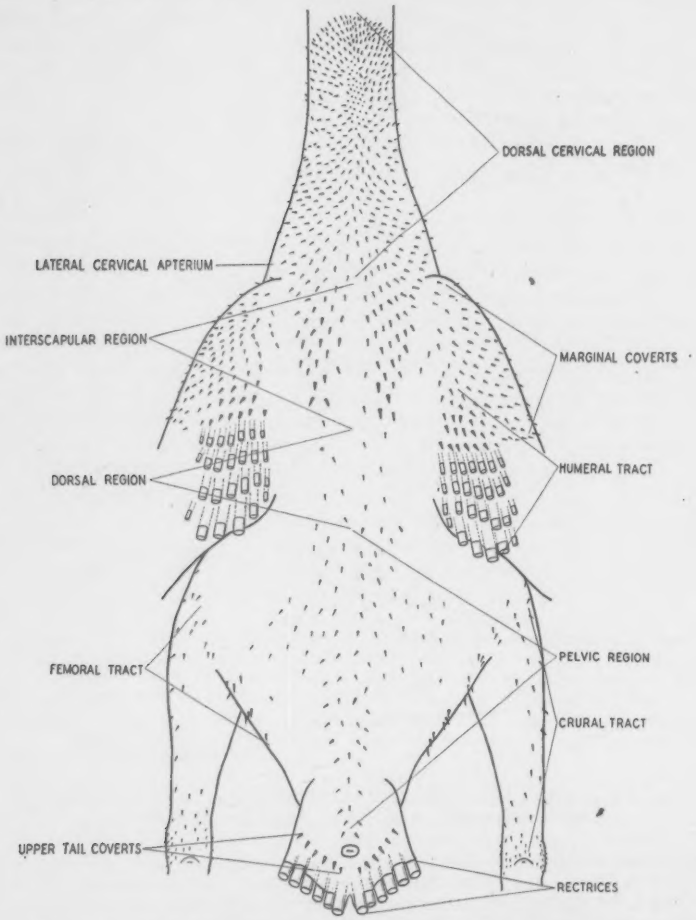

Fig. 66. Tracts and regions of dorsal surface of the California Condor, x 3/11.

The pelvic region is a broad irregularly arranged field (fig. 66), which at its maximum width consists of five longitudinal rows on either side of the midline. There are no feathers inserted directly on the midline in front of the free caudal vertebrae. Yet, there is no marked median apterium, the median space being no greater than the normal space between feather rows laterally. Occasional feathers adjoining the midline are inserted so as to extend across the line. The pelvic tract narrows to three feathers at the posterior end of the pelvis and continues as a narrow line of feathers to the

base of the oil gland. Behind the broadest points of the pelvic region are single feathers that connect it with the femoral tract. There is no lateral pelvic region. The feathers of the pelvic region increase in size posteriorly, approximately doubling in length.

Throughout the spinal tract there is heavy down between the contour feathers. Down also covers the apteria lateral to the interscapular and pelvic regions.

The spinal tract of *Gymnogyps* contrasts with that of *Cathartes* in the following points: pronounced ruff; somewhat narrower apterium between the two parts of the interscapular region; interscapular region more gradually tapered; greater irregularity of feather placement (at least in specimen studied); broader, less axial, pelvic region and less distinct median space in this region. The posterior extension of the tract along the base of the tail is closely similar in the two genera. The interscapular apterium is more like that of *Buteo* or *Pandion* than like that of *Falco* or *Cathartes*. In general, however, the tract conforms to the cathartid type, including *Pandion*, as defined by Compton.

Ventral tract.—Posterior to the submalar region there are a very few vestigial feathers in the ventral cervical region, but behind these, there is an area 2 cm. in length that is entirely bare. The feathers of the ruff or collar extend over the sides of the neck from the dorsal cervical region, but the collar is incomplete ventrally. Fairly compact down feathers, 1 cm. long, that perhaps represent reduced contour feathers, occupy the ventral cervical apterium between the ventral ends of the collar and behind the completely naked apterium of the anterior ventral surface. Still farther posteriorly the ventral cervical apterium is devoid of down. The contour feathers of the ventral cervical region are lanceolate, widely spaced, and three or four rows next to the ventral apterium are directed anteroventrally, although the shafts of some curve posteriorly.

At the shoulder the ventral cervical region is continuous with the humeral tract. The sternal region is continuous ventrally. Anteriorly there is no demarcation of sternal and axillar regions, the feather covering, except for the median apterium, being continuous out on to the ventral surface of the humerus as the subaxillar region (see Compton, p. 191). A short distance from the shoulder the marginal coverts become separated from the subaxillar region by an apterium.

A row of large feathers extends laterally from the axillar region into the axilla proper and on to the arm posterior to the subaxillar rows. At this same level on the body the axillar region becomes separated from the sternal region by an apterium that is entirely enclosed by the ventral tract (fig. 67). This apterium is bounded posterolaterally by a single row of feathers.

All the feathers of the sternal region are to varying degree lanceolate. The feathers in the eighth to tenth longitudinal rows lateral to the midventral apterium at the base of the wing are of almost normal form and some are white on the outer webs. Usually there are two or three such rows of black and white feathers, and then the tract narrows into the two subaxillar rows which consist of feathers that are white except for their shafts. The feathers of the posterior row of the subaxillar region are greatly elongated, maximum 23 cm.; those of the anterior row are no longer than 8 cm. The two terminal members of the row that extends from the axillar region into the axilla proper are elongated, nearly pure black, and not lanceolate. The most posterior row of marginal coverts of the under surface of the humerus is partly white. The downs, which are abundant all through the ventral tract, enclosed sternal apterium, and lateral apteria become gray or whitish in the subaxillar area.

In the abdominal region the ventral tract narrows to a single line of feathers that ends in front of the anus. All the feathers are lanceolate.

The ventral tract of *Gymnogyps* corresponds in most essentials with Compton's cathartid pattern. The extension of a row of axillars through the axilla to the humerus is identical with the condition in *Cathartes*. The major point of difference in *Gymnogyps* is the prominent sternal apterium enclosed between axillar and sternal regions. This apterium, described by Nitzsch (1867, p. 51) as an insular space, was not found by Compton in *Cathartes*. Nitzsch reported it as prominent in the King Vulture (*Sarcoramphus papa*) and as small in the Black Vulture (*Coragyps atratus*). He found it "not particularly perceptible" in the Andean Condor (*Vultur gryphus*) and apparently not particularly distinct in *Cathartes*. Nitzsch had skins only for examination, except for *Sarcoramphus*.

Caudal tract.—The twelve rectrices insert in the uropygium without a patagium. Loye Miller (Condor, vol. 39, 1937, p. 161) reports an abnormal number, seven, on one side of the pygostyle. There are twelve upper tail coverts in a single row. Except for the outer two on each side, these are inserted lateral to the corresponding rectrix, but are directed somewhat laterally. There is no postpelvic region. The oil gland is without feathers of any kind.

There are twelve major under tail coverts, each of which inserts lateral to the base of the corresponding rectrix, except at the outer ends of the series. All tend to be directed laterally to cross the bases of the rectrices. The central coverts are largest.

The single row of minor under tail coverts has three feathers on each side, irregularly placed relative to the major coverts. There are single feathers on either side, representative of another series

of under tail coverts. These lie between the outer members of the series of minor coverts and the anal region.

Similar feathers occur in *Cathartes*, although they were not shown by Compton.

The anal circlet is complete and outside it there is a second partial circlet on the posterior and lateral sides.

Over the ends of the pubes, anterior and lateral to the anus, are a few reduced feathers, some of them difficult to distinguish from downs. These constitute a weakly developed postventral region.

Gymnogyps differs from *Cathartes aura* in lacking a postpelvic region and in the possession of a poorly developed postventral region. In *Cathartes* the anal circlet is incomplete and there is no outer circlet, and the minor under coverts number six instead of three on each side.

Important resemblances in *Cathartes* and *Gymnogyps* are: Lack of patagium at the base of the rectrices; reduction of under tail coverts; nude oil gland.

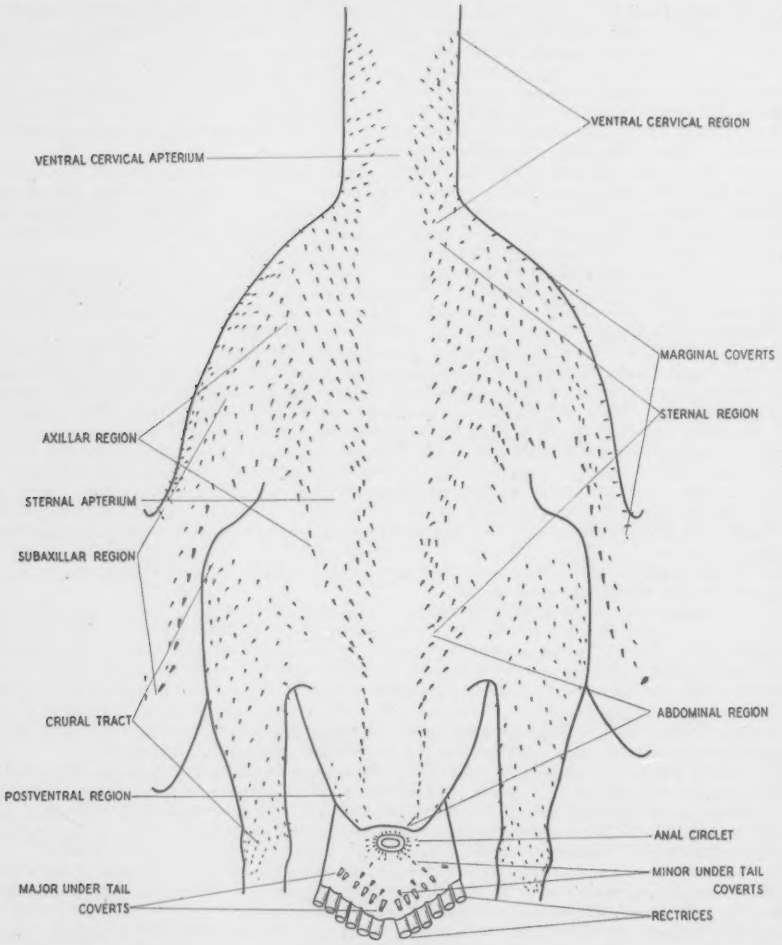

Fig. 67. Tracts and regions of ventral surface of California Condor, x 3/11.

Humeral tract.—This tract begins at the anterior angle of the shoulder where it is connected with the ventral cervical region. The feathers are arranged in diagonal rows that anteriorly are continuous with rows of marginal coverts on the anterodorsal aspect of the humerus. Posteriorly the rows are transverse. Only the five posterior rows are entirely separate from the marginal coverts. The feathers of the tract increase in size posteriorly, attaining a length of 38 cm. in the last row. In the last row, the central feathers, four in number, are longer than the terminal members of the row. In each of the four rows preceding the last there are five large feathers.

Gymnogyps differs from small falconiforms only in the greater numbers of large feathers in the posterior transverse rows. In other falconiforms there are usually three or four such feathers per row.

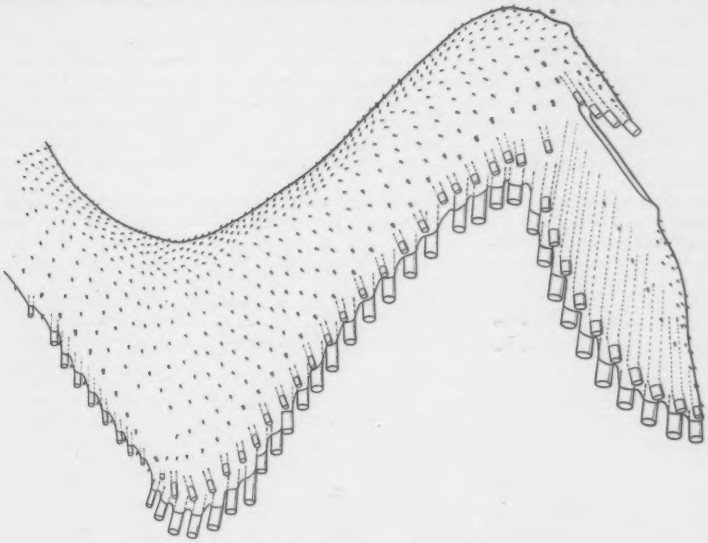

Fig. 68. Dorsal surface of wing, x 3/11.

Alar tract. Dorsal surface.—There are 10 tertiaries (9 in *Cathartes*), the largest ones being in the center of the series (fig. 68). The most distal member is inserted on the joint, is much smaller than the others, and is in line with the middle upper coverts of the forearm (not the lesser upper secondary coverts as stated by Compton, p. 202). The most proximal tertiary is separated from the others by a greater interval than that between other members of the series. Proximal to it is still another feather, in line with the tertiaries, that is much smaller. It also is in line with a row of lesser coverts that runs across the axis of the humerus. It seems to be best considered one of this latter group.

The secondaries number 22, the inner two being smaller than the others, and the last little more than half the length of the eighteenth secondary. No patagium joins the secondary quills, and a carpal remex is lacking.

There are 10 well developed primaries and a vestigial eleventh primary distally that is no larger than the adjacent coverts.

Coverts on the humeral segment consist of one row of 8 enlarged feathers inserted above and between the nine proximal tertiaries. These are separated at the elbow from the lesser coverts of the forearm.

Greater secondary coverts, as usual, are inserted on, or proximal to, the bases of the secondaries to which they correspond, but cross over to lie in the space distal to their respective remiges. The wing is diastataxic and hence there are 23 greater coverts. The first five (distal) coverts are set lower on the surface of the wing than the proximal ones and suggest the embryonic continuity with the more proximal secondaries which Steiner (Jenaische Zeit. für Naturwissenshaft, vol. 55, 1917, pp. 221–496) has demonstrated. A carpal covert is set in line with the greater secondary upper coverts, but it is separated by a relatively large interval from the first secondary covert. Proximally, the greater upper

secondary coverts are continuous with the first row of under coverts of the tertials. Middle secondary coverts are inserted between the greater coverts and also occur proximal to the last and distal to the first greater covert. Thus, the series consists of 24 feathers. There is a corresponding middle carpal covert. Five axial rows of lesser coverts overlie the radius and ulna. These and the row of middle coverts are deflected at the diastataxic break so that the rows may be thought of as either curving upward here (the embryonic rows) or, with an irregularly set feather, continuing along the axis of the arm. Distal to the diastataxic point there are six rows of lesser coverts.

The bases of the secondaries, especially the outer webs, are gray or dull white. Secondaries 1 to 4 show little of this. The greater upper secondary coverts are gray basally and whitish distally, especially on the exposed outer webs. Extreme development of white and gray occurs in the middle of the series, the terminal members being nearly black.

The dorsal coverts of the patagium and of the humeral surface are continuous with the lesser upper secondary coverts and with the marginal rows. The four anterior rows of marginals are more closely set than are the lesser coverts and distally on the forearm contrast sharply with them.

The coverts of the hand consist of 10 greater upper coverts, and 7 (8 in *Cathartes*) middle coverts, beginning distal to greater covert 4 and continuing to the margin of the wing. The greater coverts are bent distally across the bases of the primaries as described by Loye Miller (*op. cit.*, p. 160). Three rows of marginal coverts begin at the base of primary 8. The most posterior row might be considered lesser coverts.

The alula bears 4 main feathers and coverts in rows that are continuous over the wrist with the marginals and lesser coverts of the forearm. The claw on the pollex is curved and is 14 mm. long on one wing, 23 mm. on the other.

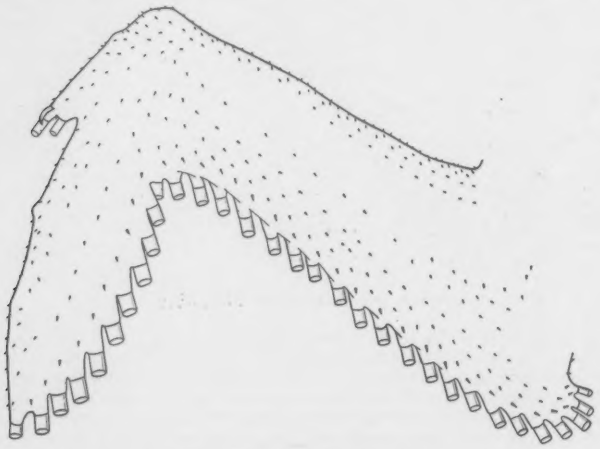

Fig. 69. Ventral surface of wing, x 3/11.

Under surface.—Under coverts of the tertials consist of one row of 9 feathers, each inserted between two tertials (10 in number). These coverts are continuous at the elbow with the greater upper secondary coverts. Although there are no middle under tertiary coverts, a series of downs may represent them. The under tertial coverts are whitish basally and the tertiaries are slightly gray basally. On the posterior ventral aspect of the humerus is an entirely bare area.

The 22 greater under secondary coverts are set between the bases of the secondaries, with two between secondaries 4 and 5 (fig. 69). Middle under coverts are set anterior and only slightly distal to the greater coverts. There are two between secondaries 4 and 5 and 24 in all, for the row continues proximally around the elbow beyond the secondaries. All these coverts are blackish, but the middle coverts are less intensely pigmented.

Two rows of lesser under secondary coverts lie posterior to the ridge of the ulna. These rows are shorter than the rows of middle and greater coverts, not extending so far around the elbow. They merge with rows on the under surface of the hand across the carpal region. All are white except for their shafts. Anterior to the ulna is a single row that runs from the marginals at the base of the alula

to the anterior side of the elbow. Here two additional rows appear and the area connects with the subaxillar region of the under humeral surface. These feathers are white, as are those behind them, and of about the same size. At the wrist they are bicolored and the extra rows at the elbows are not entirely white.

The 11 greater under primary coverts lie between the bases of the primaries, there being one proximal to the first primary and another distal to the last. Anterior and proximal to the first greater under covert is a small feather in line with the middle under secondary coverts that may represent a carpal covert. It is not associated with the first secondary. The greater under primary coverts are black.

The middle under primary coverts are a continuation of the posterior row of lesser under secondary coverts, and are white proximally, becoming black on the outer vane distally.

The lesser under hand coverts consist of one principal row and a short second row on the skin above the intermetacarpal space. The lesser coverts are continuous with the anterior row of lesser under secondary coverts behind the ulna. They are white, or partly white, but distally may be entirely black. Marginal coverts of the under surface of the hand and alula are entirely black.

Three rows of marginal coverts of the humeral and ulnar segments occur on the under wing surface. The posterior row is chiefly pure white, with black shafts, but bicolored feathers occur at shoulder and wrist. The middle row is partly white in the center of the patagium and the anterior row is entirely black.

The pterylosis of the wing corresponds with that of *Cathartes* in detail. It conforms to the general cathartid type as described by Compton in having four enlarged alula feathers, narrow propatagium, and a claw on the pollex. However, the claw is curved, not straight. Both *Cathartes* and *Gymnogyps* lack the carpal remex. The number of secondaries and, accordingly, the number of coverts are less in *Cathartes* (see Compton, p. 201).

Femoral tract.—This tract consists of 6 or 7 diagonal rows of 3, rarely 4, long normal, or slightly lanceolate, feathers. This is the typical cathartid condition. The two distal rows merge with the rows of the crural tract. The middle of the tract is connected with the pelvic region of the spinal tract by a single feather.

Crural tract.—The leg below the knee is not densely set with feathers, but is fairly continuously covered except dorsomedially. In dorsal aspect only two or three rows show, these being on the dorsolateral surface. In *Cathartes* two additional rows occur on the dorsomedial surface. At the heel the feathers are much reduced. The feathers in *Gymnogyps* are short and normal medially and proximally, but laterodistally they are weakly lanceolate, forming a poorly developed tuft or flag.

In comparing the pterylosis of the Condor and the Turkey Vulture, one is impressed with a fundamental similarity in plan. From such a comparison a sense of values emerges as to the importance of the various aspects of feather arrangement.

In these two vultures the alar tracts are remarkably similar. Details of the feather spacing, numbers of rows, and manner of insertion in the skin correspond closely. This is not merely a reflection of the general stability of alar pterylosis, for many of these details are not the same in other falconiforms. The greater number of feathers in the rows of the forearm of the Condor results in no difference in arrangement. It seems that feathers have been gained or lost in the center of the forearm series in these vultures without disruption of the complex patterns at elbow and wrist.

The humeral, femoral, and crural tracts show few significant differences in *Gymnogyps* and *Cathartes*. But, the arrangement of the femoral tract in the Cathartae is a feature of special significance, distinguishing this group from others of the order.

In the spinal tract, the difference in breadth of the pelvic area suggests that extent of this region should not be given great weight in phylogeny. The absence of feathers on the midline and the confluency of dorsal and pelvic regions, in which the two vultures are alike, are characters of more importance.

On the ventral surface, the general continuity of feather areas and the arrangement of rows in the axilla are fundamental likenesses, but presence of an insular apterium within the ventral tract overlying the sternum varies strikingly among the New World vultures.

The caudal areas in the two vultures show basic resemblances in the lack of patagia about the quills of the rectrices, in the reduction of under tail coverts (although the details differ), and in the lack of feathers on the oil gland. Differences in the anal circlet and in the weakly developed postpelvic and postventral regions seem more evanescent.

The capital tracts of the Condor and Turkey Vulture do not correspond closely. It is difficult to point to significant similarities other than the general tendency to reduction of feathering and the preservation of normal patterns in loral and auricular areas.

The items in Compton's (*loc. cit.*) diagnosis of the cathartid pattern (including the Osprey) that must be abandoned because of nonconformity in the California Condor are: ventral tract extended over entire ventral surface; and straight (rather than curved) claw on pollex. Further items which still may be valid, but which appear to us to be of minor importance are: reduction of certain capital apteria; spacing of feathers in, and width of, humeral tract. Otherwise, his diagnosis seems significant, and the resemblance of the Osprey to the cathartids is substantiated. It is only natural that there are many characters of pterylosis common to *Cathartes* and *Gymnogyps* that are not shared by the related, yet distant, *Pandion*.

Museum of Vertebrate Zoology, University of California, Berkeley, September 10, 1938.

FROM FIELD AND STUDY

Red Crossbills Feeding on Juniper Galls.—At noon on May 26, 1938, two Red Crossbills (*Loxia curvirostra*), apparently male and female, were watched for over fifteen minutes as they systematically foraged in the Utah junipers adjacent to our dwelling on the south rim of the Grand Canyon, Arizona. The birds were working on the small pear-shaped galls (about 1 cm. long), that were fairly common on these trees. These galls were made by one of the gall midges or flies, *Rhopalomyia sabinae*, of the family Cecidomyiidae. Examination of the galls disclosed that the untouched ones either had the egg or larva of this insect in their hollow centers, whereas all the galls that the crossbills had worked on were cut open and the insect egg or larva removed. The birds, intent on feeding, could be approached very closely and their method of attack determined. The gall was pierced on opposite sides near the base by the tips of the bird's bill; continued closing of the bill cut the gall completely through, except for the base. Finally, though this could not be perfectly seen, the tongue was deftly protruded into the opened gall to obtain the exposed egg or larva. The whole process of feeding on one gall took less than a couple of seconds, and obviously the bill played no part in extracting the enclosed egg or larva.

No other crossbills were observed feeding on the galls, although they were seen in yellow pines nearby. It is interesting to speculate as to whether this pair of birds alone had made the discovery of this available source of food.—FRANK RICHARDSON, *Grand Canyon, Arizona, June 3, 1938.*

An Exceptional Influx of Wood Ibises into Southern California.—Although there doubtless are Wood Ibises (*Mycteria americana*) in southern California every summer the numbers that have been observed this year are so large as to warrant special notice. In July, 1938, people began coming or telephoning to the San Diego Natural History Museum to report that they had seen the large white birds, until it became almost a daily occurrence. Ocean inlets, rivers, lakes and irrigated fields in localities too numerous to mention, and even the ponds at the zoo in Balboa Park, were reported as visited by the ibises. They evinced their customary fearlessness, allowing close approach and observation from automobiles along highways. The majority of the birds appear to have been immature. The largest figures reported were 1500 to 2000, seen by L. M. Huey in an 80-acre alfalfa field (where the ibises were eating grasshoppers) on August 7 and again on August 17, one mile east of Seeley, Imperial County. About 500 were reported by Bernard Bailey at Hedionda Slough, San Diego County, from about August 1 to 14. Individuals are still here, there being on this date seven birds in the Mission Valley pool to which I referred in a previous note (Condor, vol. 33, 1931, p. 29), and one in the zoo grounds, which has become so tame that it feeds from the hand.—CLINTON G. ABBOTT, *San Diego Society of Natural History, Balboa Park, San Diego, California, September 19, 1938.*

Winter and Spring Gull Records from the West Coast of Mexico.—The following notes on gulls were obtained on a trip to the coast and islands of western Mexico in the early part of 1938.

Larus glaucescens. Glaucous-winged Gull. Seen occasionally along west coast of Lower California (near Cedros Island, January 18, March 21; San Bartolome Bay, January 19-20; Magdalena Bay, January 29; San Lucas, February 1). One adult seen and another found dead on beach at Socorro Island, March 20; two immatures seen at Clarion Island, March 22; several at Guadalupe Island, April 6-8, and off San Martín Island, April 9.

Larus occidentalis wymani. Wyman Gull. Rather rare along southern part of peninsula of Lower California. Three seen at San Lucas, February 1. These birds, sitting on a small rock in the bay, were approached within forty feet, so that the color of feet and legs and the shape of the bill were clearly seen. They definitely were not *L. o. livens*, of the Gulf of California. This latter bird was not seen anywhere by me, although it was especially looked for.

Larus argentatus smithsonianus. Herring Gull. Small companies in northward migration: San Benito Islands, April 2-4; Guadalupe Island, April 8; San Martín Island, April 9.

Larus californicus. California Gull. The most common gull from middle Lower California south to Jalisco. As in the case of *L. glaucescens*, immatures were much more plentiful than adults in the southern part of the range. Seen in small numbers at Chamela and Tenacotita bays, Jalisco. One adult and one immature noted at Clarion Island, March 22; one immature near Alijos Rocks, March 30; common between Alijos Rocks and Cedros Island, March 31.

Larus atricilla. Laughing Gull. First met with at Banderas Bay, Jalisco, February 13; rather common from this point south to Acapulco and Escondido Bay, Oaxaca.

Larus philadelphia. Bonaparte Gull. Several seen at San Lucas, Lower California, February 1.

Larus heermanni. Heermann Gull. Common at Banderas Bay, Jalisco, February 13.—G. WILLETT, *Los Angeles Museum, Los Angeles, California, August 31, 1938.*

A New Spotted Screech Owl from Guerrero, Mexico.—Study of the Salvin and Godman collections of Mexican birds in the British Museum has resulted in the discovery of an astonishing number of unexpected novelties, even from supposedly fairly well known areas. One of these is here described, based on a pair of Spotted Screech Owls (*Otus trichopsis*) collected in the isolated Sierra Madre del Sur of Guerrero by Mrs. H. H. Smith, who spent some time there in the Salvin-Godman interests. These two specimens are very distinct from *trichopsis* of the Valley of Mexico and northward, and are named as

Otus trichopsis guerrerensis, new subspecies

Type.—Adult female, no. 90.5.16.46, British Museum; Omilteme, Guerrero, Mexico; July, 1888; altitude 8000 feet; collected by Mrs. H. H. Smith.

Subspecific characters.—Similar to *Otus trichopsis trichopsis*, but coloration very much paler throughout, the white markings everywhere at a maximum, the brown, gray, and black, at a minimum; thighs and tarsi immaculate, the former pale cinnamon, the latter white.

Range.—Known only from the two specimens from the type locality.

Remarks.—Both specimens are fully adult and have completed the annual molt. They are in the gray phase.

The comparative color differences between *trichopsis* and *guerrerensis* are much the same as between *Otus asio cineraceus* and the palest specimens of *Otus asio mccallii*.—A. J. VAN ROSSEM, *Dickey Collections, California Institute of Technology, Pasadena, California, August 2, 1938.*

Birds Observed in the Vicinity of Twenty-nine Palms, California.—In the last volume of the Condor (vol. 39, 1937, p. 210–219) Frances Carter described the ornithological features of the oasis at Twenty-nine Palms, San Bernardino County, in the southern Mohave Desert. She listed the species observed there during two periods: December 30, 1933, to May 17, 1934; and October 17, 1934, to May 30, 1935. She also tells of some of the birds seen at Barker's Dam, twenty-five miles southwest of Twenty-nine Palms. I have been fortunate enough to make two visits to this region, but for much briefer periods: January 18–22, 1935; and April 22–29, 1937. Certain of the records made in the course of my first stay were mentioned by Miss Carter, but the following few notes selected from those of my second trip, in 1937, were not presented for inclusion in her paper. Of the species mentioned, all but the Tolmie Warbler and Desert Sparrow are absent from her list.

Aquila chrysaëtos. Golden Eagle. Two were seen circling over the hills east of the road leading to Forty-nine Palms on April 27.

Actitis macularia. Spotted Sandpiper. One was seen on the edge of a pond on the western half of the oasis close to the Twenty-nine Palms Inn on April 27.

Tringa solitaria. Solitary Sandpiper. Two were seen at Barker's Dam on April 28, first while flying down the outlet stream from the dam, then later perched on the mud at the edge of this stream where they were observed closely.

Chaetura vauxi. Vaux Swift. Two were seen flying over the Twenty-nine Palms Inn and the western part of the oasis on April 27. One also, in the company of many White-throated Swifts, was seen at Barker's Dam on April 28.

Aëronautes saxatilis. White-throated Swift. Twelve or more were seen flying over Barker's Dam on April 28. A pair was observed more than once in what may have been copulation in the air; one mounted the other as they swooped downward.

Heleodytes brunneicapillus. Cactus Wren. One noted both in chollas and in a Joshua tree in Yucca Valley along the highway west of Twenty-nine Palms on April 22. Also one was heard singing among the Joshua trees along the road from Twenty-nine Palms to Split Rock on April 26.

Vermivora ruficapilla. Calaveras Warbler. One was seen at Barker's Dam on April 28.

Oporornis tolmiei. Tolmie Warbler. Observed in a mesquite clump near the Twenty-nine Palms Inn on April 23. Miss Carter did not note this bird before May 11, 1934.

Amphispiza bilineata. Desert Sparrow. An adult seen with food in its bill in the presence of streaked young, along the road from the Twenty-nine Palms Inn to Split Rock on April 26.

Spizella breweri. Brewer Sparrow. A flock was seen and heard singing along the road from Twenty-nine Palms to Barker's Dam at a point just north of the Riverside County line on April 28.—LAIDLAW WILLIAMS, *Carmel, California, September 15, 1938.*

Feeding Habits of the Treganza Blue Heron.—During the spring and summer of 1938 an abundance of Treganza Blue Herons (*Ardea herodias treganzai*) has been noted around the shores of Lake Mead, Clark County, Nevada. For some time the cause for the great influx of herons was not discovered. However, careful observations around the areas of concentration revealed that an abundance of food was the contributing factor. In several areas where mesquite and low shrubs were

numerous, the rising waters trapped hundreds of small rodents, as extensive necks of land became tiny islands. Here the herons gathered in large numbers and literally patrolled the area. Catching the rodents was a relatively simple matter. The heron would simply wade past a bush with its load of mice and kangaroo rats and leisurely pick them off one by one. The procedure used in catching the rodent was the same each time. There would be a swift strike of the head, the rodent would be tossed into the air and in a second it would disappear head first down the bird's throat. As the waters of Lake Mead continue to rise in the spring of 1939, similar scenes will no doubt be reenacted.—Russell K. Grater, *Boulder Dam Recreational Area, Nevada, September 1, 1938.*

Audubon Warbler Nesting in Solano County, California.—On May 29, 1938, J. Duncan Graham and I were searching for gnatcatcher nests in the hills near an artificial lake two miles north of Cordelia, Solano County, California. While we were watching an adult robin which was scolding us vociferously from the close proximity of its nest, we noted another nest in the background in an adjacent tree. Mr. Graham climbed to it and a female Audubon Warbler (*Dendroica auduboni*) left the nest which held five young birds. These we judged were approximately five days old. The male, in full plumage, came to the nest repeatedly while we watched this interesting family.

The nest tree was a tall slender white oak, and the nest was about twenty-five feet up in a crotch formed by a limb branching from the main trunk. The nest was of very similar construction to those I have taken in the Sierra Nevada. It was composed of weed stems, and was plentifully lined with horse hairs and bird feathers. The young were gone on our next visit (June 5) and the nest was taken and placed in my collection. I believe this is the first record of this species nesting in the San Francisco Bay region.—Emerson A. Stoner, *Benicia, California, August 26, 1938.*

Nesting of an Eastern Kingbird in a Deserted Oriole Nest.—That certain birds appropriate deserted nests of other species is not particularly uncommon. However, the successful occupancy by an Eastern Kingbird (*Tyrannus tyrannus*) of a deserted hanging nest of a Bullock Oriole (*Icterus bullockii*) is unusual.

Such an occurrence was observed by the writer, in company with E. R. Kalmbach and Clarence Sooter, at the Buena Vista Station, Malheur Migratory Bird Refuge in eastern Oregon on July 15, 1938. It was reported that the oriole had successfully reared its brood in its characteristic hanging nest. The nest was made of string, horsehair, and plant fiber, and was attached about 12 feet above the ground to some terminal and partly drooping branches of a cottonwood tree.

Shortly after the nest had been deserted by the oriole family, it was appropriated by a pair of Eastern Kingbirds. When observed by our party the nest had its full complement of four hungry pin-feathered young. Even though the nestlings were not much more than half grown, they appeared to fill the cup of the nest completely. Although eastern Oregon is just within the western limit of the range of the Eastern Kingbird, this species is rather common at the Malheur Migratory Bird Refuge. —Clarence Cottam, *Bureau of Biological Survey, Washington, D.C., September 2, 1938.*

Inyo Screech Owl at Fallon, Nevada.— On August 14, 1938, Mrs. Anna Bailey Mills, at her home 4 miles west of Fallon, Churchill County, Nevada, showed me two mounted screech owls and consented to my taking them to the Museum of Vertebrate Zoology for comparison. Mrs. Mills described these owls as fairly common on her ranch, and particularly in evidence in spring when they most often attract attention to themselves by their calls.

Both specimens were taken 4 miles west of Fallon, the male on December 8, 1937, and the other, judged by its larger size to be a female, at some earlier date. Measurements of these are, respectively, as follows: wing, 163 mm., 173; tail, 84, 88; culmen from cere, 13.4, 15.2. Comparisons with specimens of races from adjoining areas revealed greatest similarity to the type and three other winter-taken specimens of *Otus asio inyoensis* from Owens Valley, California. The birds from near Fallon, so far as I can see, differ importantly only in having more brownish color on the ruff and breast; they have, however, less brownish color than average individuals at hand of *O. a. macfarlanei* and *O. a. quercinus*, and of course much less prominent black markings.

The race *Otus asio inyoensis* seems not before to have been definitely recorded from Nevada, although Oberholser's (Jour. Washington Acad. Sci., vol. 27, 1937, p. 356) statement that "Specimens from Vernon and Jensen, northern Utah . . . referable to *Otus asio inyoensis* . . . indicate that the . . . subspecies extends over Nevada as far north as Fallon and east to northeastern Utah" suggests that he at least knew of the occurrence of screech owls near Fallon.—E. Raymond Hall, *Museum of Vertebrate Zoology, Berkeley, California, August 25, 1938.*

A Water Ouzel Uses Wings in Swimming.—The interesting note by Charles W. Michael (Condor, vol. 40, 1938, pp. 185–186) on the habits of the Ouzel elicits the following. Like Mr. Michael, I had frequently seen in print the statement that the Ouzel (*Cinclus mexicanus*) uses its wings in swimming under water, and therefore when I saw an Ouzel swimming under water in what was, to me, the expected fashion, it did not seem especially noteworthy. The individual in question was a young bird, just out of the nest, and it was unable to fly more than a few feet. I made an effort to capture the bird with a landing net, and in its successful efforts to escape it walked on the bottom, swam on the surface (feet only), and also swam under water, always in the latter case using its wings, apparently to good effect. The wing strokes were slow enough to distinguish easily, and I should guess were made at a rate not far from two a second. The wings were extended only part way, apparently much less than in aerial flight. The observation was made in the Elwha River in Washington, and part of the time the bird was in a pool of clear water 18 inches to 2 feet deep with a very moderate current. I was part of the time standing directly over the bird which swam (with its wings) within inches of my feet. I did not note down, and do not recall, whether or not it used its legs while it was using its wings. There is the possibility that this action was that of a young bird, but I suspect it was rather characteristic of a desperate one. Perhaps Mr. Michael's example that failed to use its wings was exhibiting the normal, undisturbed behavior of the species.

Other birds that I have seen use their wings under water when hard pressed by danger are a downy young Spotted Sandpiper (*Actitis macularia*), Pintails (*Dafila acuta*), and Baldpates (*Mareca americana*). The sandpiper did not seem to get any appreciable help from its wings, which were spread out and fluttered, nevertheless. The ducks of both species were suffering from botulism and could not fly, though they were otherwise active. Other Pintails and Baldpates, at the same time and place, and under the same conditions of illness and terrain used their feet only in escaping under water.

I have had excellent views through strong binoculars of Pigeon Guillemots (*Cepphus columba*) and murrelets swimming under water in Deception Pass, Washington, under a highway bridge. They were undisturbed and appeared to be feeding, and they invariably used their wings.—Richard M. Bond, *Santa Barbara, California, September 1, 1938.*

The Petrels of Castle Rock, Del Norte County, California.—Jackson S. King and the writer spent the nights of June 23 and 24, 1938, on Castle Rock, off the coast of Del Norte County, to the north of Crescent City. Our primary purpose was to listen to the nocturnal songs of the Beal Petrels (*Oceanodroma leucorhoa beali*). The petrels responded nobly with a continuous performance from about ten o'clock until shortly before dawn. Our beds were placed on the long wiry grass, which covers about an acre of high central plateau. We were aroused by a startling burst of sounds. The air was filled with innumerable birds, zigzagging in flight so closely and erratically that they often struck each other and the boards of our windbreak. King, as he came out of his first sleep, called out realistically, if somewhat inelegantly, "The gibbering bats of Hell!" With a board he tried lustily to collect a few but failed. It was like trying to smite floating bits of thistledown. From all over the tract arose answering calls, sputtering from burrows and grass. We could hear them even below our blankets. We had been sleeping on them! Several, as they emerged from beneath us, fluttered into the air from our beds, several times hitting our faces and hands. It was weirdly uncanny in the misty darkness.

Their notes covered a considerable range of pitch, breaking and blending into unceasing calls, squeaks, twitters, groans, mournful cries and crowings, much like the efforts of young bantam cockerels, save that labials (p's and b's) not palatals (k's and g's) were used. The vowels were definitely short e's. We felt, at times, that individual virtuosi could be segregated. There were diminuendos and crescendos of volume. There came occasional contrapuntal bass runs from a few scattered, seemingly larger birds, judging from the depth and power of tone. These notes often seemed to be a progression from tonic to sub-dominant, for example from C to F, with a dotted eighth and a sixteenth on each pitch, ending with a full stop on F. King thought some of these bassos used occasional sliding chromatics and were often a bit off key. He remarked that all the ensemble lacked was a tom-tom to give their amazing symphony a sense of rhythm. It is impossible to describe and analyze the whole complex, as it will doubtless seem different to every hearer, but it remains as an unforgettable experience, once heard.

The flashlight seemed to indicate a few lighter birds in the air. Were they Fork-tailed Petrels (*Oceanodroma furcata*)? Were some of the bass singers Cassin Auklets (*Ptychoramphus aleuticus*)? A hurried and very superficial search of burrows in the daytime revealed only the Beal Petrels.—E. W. Martin, *Stanford University, California, August 2, 1938.*

A Male California Quail Hatches a Brood.—An instance of a male California Quail (*Lophortyx californica californica*) successfully incubating a set of eggs after the female had been killed was observed during the 1938 quail nesting study at the San Joaquin Experimental Range in the foothills of Madera County, California. The nest (S. J. E. R. no. A37, 1938) was discovered on May 24 under the edge of a small granite boulder. The female was then incubating a clutch of 20 eggs. A cock, presumably the mate, was perched in a nearby tree. Daily visits were made to the nest until May 28, and the hen was seen incubating on each occasion.

On May 31, female quail feathers, sufficient to indicate a kill, were found about 4 feet from the nest and a cock was found sitting on the eggs. The next day, June 1, the cock was again on the nest. He allowed the observer to approach within 3 feet without flushing.

On June 2, at 9:00 a.m., the nest was visited and no birds were found. Nine of the 20 eggs had hatched, as evidenced by pipping rings on the shells. Of the remaining 11 eggs, 2 were infertile and 9 were within one or two days of hatching, with most of the embryos showing sign of life. The low percentage of hatching success was possibly due to inefficient incubation on the part of the cock. The cock and his nine young were seen several times subsequently. On June 25, the last date of observation, only 4 young remained in the group.

These observations substantiate statements by Grinnell, Bryant and Storer (Game Birds of California, p. 529) and Price (Condor, vol. 40, 1938, p. 87) that the male California Quail will take over incubation in event of the female's death. The present observation is unique in that the cock succeeded in hatching at least part of the clutch and in caring for the chicks.—BEN GLADING, *San Joaquin Experimental Range, O'Neals, California, September 19, 1938.*

Notes on the Distribution of Loons and Grebes in California.—Knowledge that Dr. Joseph Grinnell is preparing a revised distributional list of the birds of California provides the incentive to make available certain accumulated information on occurrences of birds in this state. Readers familiar with our avifauna may find in these notes numerous obvious statements, but the facts to be presented, although known to many, appear to be unpublished. What may seem trivial and unworthy of mention now, if left unrecorded, may soon become lost through rapidly changing conditions. Man's influence upon bird life in his recent "development" of our state has been so profound that we are often unable to appreciate changes in avian populations until they have occurred. Then, we find that records of original conditions are lacking for comparison.

Specimen numbers refer to the writer's private collection of birds or to his field numbers, which are synonymous.

Gavia immer. Common Loon. No attempt has been made to differentiate subspecifically California taken examples of this species, although the validity of the race *elasson* (Bishop, Auk, vol. 38, 1921, p. 367) is acknowledged for breeding birds of the interior of the continent. Probably both forms winter in the state and their separation, requiring measurements of specimens, is impossible without birds in hand.

An adult male (no. 139) in full summer plumage was taken on a small fresh-water lake 2 miles southwest of Glen Ellen, Sonoma County, May 3, 1919. The birds are not uncommon along the coast in June; full plumaged adults and winter clad immatures (?) were found on Richardson's Bay, Marin County, and at the mouth of the Pajaro River, Monterey County, June 11 and 12, respectively, in 1938. An adult in full summer dress was observed on the California side of Topaz Lake, Mono County, July 6, 1923, where search failed to indicate that it was nesting.

Gavia arctica pacifica. Pacific Loon. It has been my experience that the present species is considerably more maritime in distribution along our coast than the Red-throated Loon. The latter is the common wintering loon of San Francisco Bay and neighboring inland bodies of salt water, where I have found the Pacific to be rare except in spring migration. The migration of the Pacific is a month later than that of the Red-throat. It appears that the bulk of Pacific Loons that traverse our coast may winter to the south of San Francisco Bay, possibly south of California. The Red-throated is locally the most common winter resident of the family.

Gavia stellata. Red-throated Loon. Abundant winter visitant; most of them leave in March. Capture of no. 248, a winter-plumaged female, May 22, 1921, on a salt-water ditch bordering the Black Point cut-off road, 1½ miles northeast of Ignacio, Marin County, presents an inland, also a seasonally late, record for this open water bird. It was not visibly disabled.

Colymbus nigricollis californicus. Eared Grebe. Abundant winter visitant to salt and brackish inland waters of the San Francisco Bay region, but scarcer along the open coast where it largely is replaced by the Horned Grebe (*Colymbus auritus*). Occasionally visits fresh water lakes in winter, as at 2 miles south of Glen Ellen, Sonoma County.

At least 30 pairs were nesting on Topaz Lake, Mono County, July 21, 1918 (adult collected); they also were breeding here July 6, 1923.

Aechmophorus occidentalis. Western Grebe. Numbers nested on Topaz Lake, Mono County, July 21, 1918, where sets of fresh eggs and an adult (no. 316) were collected July 6, 1923. Three seen on Sandborn Slough, near Butte Creek, 7 miles west of Pennington, Sutter County, June 13, 1925. Nests in numbers on Clear Lake, Lake County, where many were seen July 4, 1936, and July 16, 1928. Two to three hundred adults noted here on July 15, 1938, had only about twenty, one-third grown young with them. Several pairs nested on a deep pond 3 miles south of Los Baños, Merced County, June 10, 1926 (2 sets eggs). Occasional birds are to be seen on the open ocean in summer, as one off Bolinas, Marin County, June 20, 1920.

Podilymbus podiceps podiceps. Pied-billed Grebe. A completed nest and 2 birds were seen on a lake 2 miles south of Glen Ellen, Sonoma County, May 30, 1928. In 1925, a pair wintered on this lake, remaining until late April. They were then in summer plumage and were uttering courtship notes. A set of fresh eggs was taken 3 miles south of Los Baños, Merced County, June 10, 1928; found breeding commonly here in several years.—JAMES MOFFITT, *California Academy of Sciences, San Francisco, August 20, 1938.*

Some Notes from Negit Island, Mono Lake, California.—The writer, accompanied by H. S. Fuller, spent July 9 to 12, 1938, on Negit Island, Mono Lake, California. The island is about 400 acres in extent and is made up for the most part of very rough lava, but there are some areas composed of sandy soil covered with artemisia. No birds were taken, because of my belief that the island had been set aside as a bird preserve, but the following birds were seen repeatedly at close range.

Larus californicus. California Gull. The Mono Lake colony of gulls is now confined entirely to Negit Island, but formerly some birds nested on the adjoining Paoha Island (Dawson, Birds of California, vol. 3, 1923, p. 1406). We estimated that the gulls numbered approximately 3000 adults, and we succeeded in banding 510 of the then well-grown young. It might be interesting to add that on July 11 the writer was struck on the parietal region of the head by a gull swooping down from the rear; a deep scalp wound resulted. The gull was killed by the blow and an autopsy revealed a broken lower mandible, dislocated cervical vertebra, and extensive subcutaneous hemorrhage on neck, breast and belly. The skin is now in my collection (male no. 315). We were brushed several times by the gulls' wings when they dove on us, but this was the only accident. The young birds had been fed on insects and fly larvae, as well as some trout, which must have been obtained from quite a distance.

Colymbus nigricollis californicus. Eared Grebe. Both Dawson (*op. cit.*, p. 2052, and W. K. Fisher, Condor, vol. 4, 1902, p. 11) observed birds of this species in the region. We found them numerous around Paoha Island, but none was seen about Negit Island.

Phalacrocorax auritus. Cormorant. Six cormorants, which we took to be Farallon Cormorants (*P. a. albociliatus*), were seen flying over the lake on the evening of July 10.

Steganopus tricolor. Wilson Phalarope. One was seen near the western shore of the lake on July 9, and another at close range from Negit Island on July 11.

Tachycineta thalassina lepida. Violet-green Swallow. Great numbers of this swallow were nesting on the island in cracks between the loose rocks which make up the steep volcanic rubble heaps.

Say Phoebes (*Sayornis saya*), White-crowned Sparrows (*Zonotrichia leucophrys leucophrys*), Sage Sparrows (*Amphispiza nevadensis nevadensis*), California Linnets (*Carpodacus mexicanus frontalis*), and Rock Wrens (*Salpinctes obsoletus obsoletus*) were seen on Negit Island. Both adults and young of these species were noted.—WALTER F. NICHOLS, *Pasadena, California, September 4, 1938.*

A New Race of Becard from Northeastern Mexico.—The series of becards of the species *Platypsaris aglaiae* in the British Museum is probably unequalled in any institution in the world. While at the British Museum in the summer of 1938, the writer devoted some time to an attempt to work out the characters of the species in northeastern and eastern Mexico. At the time Ridgway wrote part 4 of the Birds of North and Middle America, certain material then in American museums either was not available to him or else was overlooked, for, subsequent to arriving at certain conclusions at the British Museum, I have found ample confirmatory material in America which had been collected prior to the publication of part 4 in 1907. The northeastern race, the largest of the species, is here named as

Platypsaris aglaiae gravis, new subspecies

Type.—Adult male, no. 435419, United States National Museum; Alta Mira, Tamaulipas, Mexico; February 11, 1895; collected by F. B. Armstrong.

Subspecific characters.—Largest of the races of *Platypsaris aglaiae*. Compared with *Platypsaris aglaiae aglaiae* of the highlands of central Vera Cruz and northern Oaxaca, size decidedly larger throughout; males very similar in coloration, that is, with sharp demarcation between the black head and gray

back; females decidedly paler below and very much redder above. Compared with *Platypsaris aglaiae sumichrasti* of the lowlands of central Vera Cruz and southward, coloration of males very much paler throughout, and back gray instead of black; females paler throughout, and back more orange (less rufous) red and more or less washed with gray, with prominent collar of pale orange around hindneck. Size slightly larger, save for the bill, which is about equal in the two races.

Range.—Northeastern Mexico, from the coastal region of northern Vera Cruz (Rivera; Papantla) and Tamaulipas (Tampico; Soto de la Marina) west to the interior of Tamaulipas (Carrizal; Forlon; Alta Mira; Victoria; Hidalgo), and the States of Nuevo Leon (San Diego; Montemorelos; Monterey; Cerro de la Silla), San Luis Potosi (Valles), and Morelos (Puente de Ixtla).

Remarks.—There is not sufficient material to hazard comment at this time on the geographic variation in the rose-throated becards in central Mexico. What little has been examined, however, indicates a variable population which connects the east- and west-coast races in a most erratic manner.

It may be well to emphasize that *gravis* is not in any sense an intergrade between *aglaiae* and *sumichrasti*. It is the largest of the known races and also occupies the extreme northeastern section of the area occupied by the species. It obviously is a pallid variation of the large-billed group (*hypophaeus, yucatanensis, latirostris, sumichrasti, gravis*) with no close relationship with the small-billed, gray-backed (females) series consisting of *aglaiae, albiventris, insularis,* and *richmondi.*

In the matter of local and individual variation, *gravis* exhibits a normal range. Specimens from the coast of northern Vera Cruz are intermediate toward *sumichrasti* in variable degree. Some from Nuevo Leon are distinctly paler than the average, and the palest individual of all has even been called *"albiventris"* by Ridgway. I have examined this specimen and consider it to be an exceptionally pale *gravis,* with which race it agrees in large bill and general measurements.

EXTREME MEASUREMENTS OF MALES IN MILLIMETERS

	Wing	Tail	Culmen	Width at nostrils	Tarsus
22 *aglaiae* from Vera Cruz	85-91	60-68	14.2-16.7	6.8- 8.3	18.5-20.2
57 *sumichrasti* from Vera Cruz, Tabasco, and Chiapas	84-90	64-71	17.5-19.1	8.4-10.2	19.5-22.5
48 *gravis* from Vera Cruz, Tamaulipas, Nuevo Leon, and San Luis Potosi	90-96	66-74	17.3-19.5	8.6-10.0	20.5-22.5

—A. J. VAN ROSSEM, *California Institute of Technology, Pasadena, California, September 14, 1938.*

Color Changes in a Captive Cassin Purple Finch.—In December, 1937, while collecting birds in the Providence Mountains of southeastern California, the writer obtained a live adult Cassin Purple Finch (*Carpodacus cassinii*) in typical red male plumage. The bird was returned to Berkeley, where it has been kept in a small cage. During the early months of its captivity, it was fed a diet of seeds only. Later, it was found that fruits of various kinds were taken readily, but that health was maintained without this addition.

In the summer of 1938, I was away from Berkeley and left the bird in the care of a friend, during which time it was fed only the seed mixture. Upon my return, the last week in July, many of the flight feathers of both wings and tail had been dropped. Again I left for a week, and the bird was not seen until the first week of August. At this time, it was discovered that the flight feathers of the wings that had been renewed were almost completely white, with but a margin of dark color on the tips. The feathers of the top of the head, throat, and breast had begun to drop, but had not grown in sufficiently to determine their color. The bird now was given a food mixture that is recommended for birds of the "soft-bill" type and that contains much animal matter. This was in addition to its seed ration. However, the flight feathers continued to come in white as before, and the contour feathers of the head and breast came in yellow. Some of the latter, notably those on the throat, had black edgings, a feature not seen in any wild-taken representative of the genus.

Pyracantha berries being available, they were now regularly presented, and the bird ate them readily. After several weeks, two more flight feathers grew in, this time with the ordinary dark gray color. Furthermore, the contour feathers that have grown since then have been red. The resultant plumage shows a curious mottling of red and yellow on the top of the head and on the breast.

In conclusion, the abnormal pigmentation seemingly was caused by an insufficiency in the diet, and was corrected by the feeding of red berries. It is well known that the related House Finch (*Carpodacus mexicanus*) changes color similarly, whatever the reason, but I can find no reference to such an anomaly in the species *cassinii.* In only one instance is there an indication of such variation in the specimens in the Museum of Vertebrate Zoology. An adult male collected in June, 1938, by J. T. Marshall, Jr., shows several yellow feathers on the throat. It may be assumed that yellow coloration is not common in nature, as it is in *C. mexicanus,* but that it may result from changed conditions attendant upon captivity.—DALE ARVEY, *Berkeley, California, September 14, 1938.*

Broad-tailed Hummingbird Attracted to Food of the Red-naped Sapsucker.—Twice, within less than a minute, I watched a sapsucker drive a hummingbird away from the trunk of a large mountain birch (*Betula fontinalis*). A few seconds after its second retreat the hummer was back, but my effort to obtain both birds with a single shot was only half successful; the hummer darted away. Two minutes and 40 seconds later, however, it reappeared and I was able to collect it—a thing I did because the dusk (7:45 p.m. on August 6, 1938) made sight identification uncertain and I wished to identify the birds accurately. They proved to be a Broad-tailed Hummingbird (*Selasphorus platycercus platycercus*) and an immature Red-naped Sapsucker (*Sphyrapicus varius nuchalis*). The place was alongside Lehman Creek, at 7800 feet altitude, in the Snake Mountains of White Pine County, Nevada.

Investigation revealed both old and new series of sapsucker-made perforations in the birch bark 12 feet above the ground, where the trunk was 254 millimeters in circumference. The recently drilled holes were above the older holes, and it was in these newer lesions only that I detected a slight amount of sap. This sap I supposed was attractive as food to the hummingbird. Of flowers in bloom nearby which might have occupied the hummingbird's attention I noted just two, red Indian paint brush and blue monkshood.—E. Raymond Hall, *Museum of Vertebrate Zoology, Berkeley, California, August 25, 1938.*

California Jays Catch Flies.—Early on the morning of April 6, 1938, two California Jays (*Aphelocoma californica*) were observed actively moving about the sunny and still dewy lawn of a Berkeley residence. Close observation disclosed that the jays were pursuing house flies which were fairly numerous, both flying above the grass and settled on it. A jay would hop around with head held high until a suitable fly was seen. Then ensued a short dash, usually of two feet or less but sometimes as long as four, with the head held low and extended forward. This dash, which consisted of a series of quick hops, usually ended with a final long hop, the abrupt raising of the tail, and the coincident successful capture of the fly. As nearly as could be seen the flies usually were deftly snatched before they flew, but occasionally they were caught in the air. Such a cursory observation is of significance as an indication of the adaptability of this bird to conditions in densely settled areas.—Frank Richardson, *Museum of Vertebrate Zoology, Berkeley, California, September 13, 1938.*

Records of Allen and Rufous Hummingbirds in the Sierra Nevada, California.—Frequently arguments arise over field identifications of hummingbirds which occur in summer at high elevations (8,000 to 11,000 feet) in the Sierra Nevada of California. Some observers claim that these birds are *Selasphorus rufus*, and others identify them as *S. alleni*. Many seasons' work in this area has convinced me that as regards these two species field or sight identifications are distinctly difficult and unreliable. Thus, at 11,000 feet elevation at Moose Lake in Sequoia National Park, on June 24, 1934, I collected an adult male hummingbird that had been watched in good light under most favorable conditions for observation. One observer insisted it was *rufus* and I was sure it was *alleni*. The bird (adult male, no. 9111, collection of Joseph S. Dixon and William B. Richardson) proved to be *alleni*, according to Dr. J. Grinnell who recently examined it.

I have shot three other male Allen Hummingbirds in early summer in the Sierra Nevada, and it has been my experience that most of the adult males found early in the season, from June 20 to July 20, at high altitudes in the Sierra Nevada are *alleni*. Some Rufous Hummingbirds come down the coast and invade this territory in late summer, usually in August.—Joseph S. Dixon, *National Park Service, San Francisco, California, October 1, 1938.*

NOTES AND NEWS

The fifty-sixth stated meeting of the American Ornithologists' Union, held in Washington, D. C., October 17-21, 1938, brought out the largest attendance in the records of the Union. The program of fifty-eight papers was noteworthy for the high average quality of the contributions. A new feature, much to be commended, was a symposium on "The Problem of the Individual *vs.* the Species in Bird Study." Led by Herbert Friedmann, the symposium was contributed to by Francis H. Herrick, G. K. Noble, Margaret M. Nice, Frederick C. Lincoln and N. Tinbergen. Mr. Waldo L. McAtee asked to be relieved of the duties of treasurer of the Union after his many years of service, and Mr. Rudyerd Boulton was elected to this office. Three vacancies on the Council were filled by the election of W. L. McAtee, Robert T. Moore and John T. Zimmer. Otherwise, the officers remain the same. One Fellow was elected, Ira N. Gabrielson, of Washington, D. C. Eight members were elected: Herbert G. Deignan of Washington, D. C.; S. Gilbert Emilio of Salem, Mass.; Thomas T. McCabe, of Berkeley, Calif.; Harold Michener of Pasadena, Calif.; Gayle B. Pickwell of San Jose, Calif.; Austin L. Rand of New York City; Alexander Frank Skutch of Baltimore, Md.; and E. Lowell Sumner, Jr., of San Francisco, Calif. The next meeting, which had already been set for California, was announced for June 19-23, 1939, in the San Francisco Bay area, with headquarters in Berkeley.—A. H. M.

It has become almost a yearly custom since 1929 to acknowledge the assistance of Miss Selma Werner in preparing the annual index of the CONDOR. It is a pleasure again to do so this year. Her continued efforts are especially appreciated by the editors who have learned to expect a sheaf of neat and carefully prepared index copy for each November issue.

"Formation of geographic races is probably the most usual method of differentiation of species both in the animal and plant kingdom . . ." (Dobzhansky, Genetics and the Origin of Species, 1937, p. 47). There should be no criticism of the attention given geographic races of birds, but only of the methods employed in studying them. —A. H. M.

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

AUGUST.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum, Exposition Park, Los Angeles, California, on Tuesday, August 30, 1938, at 8 p.m., with about 180 members and guests in attendance. In the absence of the president, Mr. George Willett presided.

Fig. 70. Wilson C. Hanna, member of the Cooper Ornithological Club since 1902, and contributor of many articles on the nesting habits of birds.

The minutes of the Southern Division for July were read and approved; those of the Northern Division were read by title only. Three applications for membership were read as follows: Louis M. Moos, Soil Conservation Service, Great Falls, Montana, proposed by Mrs. N. Edward Ayer; Mrs. Caroline Wells Rogers, 1006 McConnell Avenue, Route 4, Santa Rosa, Calif., by John McB. Robertson; and James S. Bancroft, 64 Sharon Avenue, Oakland, Calif., by Ralph W. Chaney.

Mr. Willett announced the marriage of two Cooper Club members, Laura Law to Harold H. Bailey, and asked all of their friends to sign the note of congratulation from the Southern Division of the Club. Mr. Willett further called attention to several new publications of interest to ornithologists: Dickey and van Rossem's Birds of El Salvador, Oberholser's Bird Life of Louisiana, Bent's Life Histories of North American Birds of Prey, Part 2, and two contributions from the California Museum of Vertebrate Zoology, Mary Erickson's paper on the wren-tits and Lawrence Compton's on the pterylosis of the Falconiformes.

There being no further business, Mr. Willett introduced Mr. John S. Garth. Mr. Garth outlined the itinerary of the 1938 Hancock Expedition, which went to the Galapagos Islands, the islands of Peru, and then inland to Colombia over the summit of the Andes. The remainder of his talk accompanied an excellent reel of moving pictures of birds seen on this trip and on that of the year previous. Of outstanding interest were the exceptionally fine views of Andean Condors in flight. These were taken with a powerful lens so that the birds could be seen very distinctly and the characteristic white wing patch was easily discernible. Mr. Garth told of the great interest of the native people in these birds. On the expedition's return, and while carrying a captive live condor, the party stopped to watch a native funeral procession go by, only to have the procession break up to look at the condor.

Other interesting scenes included slow motion pictures of the flight of the frigate bird, views of several species of boobies and the dance of the Blue-footed Booby, pictures of the Galapagos Hawks, and finally impressive shots of the tremendous extent of nesting birds on the guano islands of Peru. The White-breasted Cormorants were shown by the tens of thousands, nesting close together in long rows, and completely covering a large area. Even more abundant than the cormorants on these islands are the Piqueros, or Peruvian Boobies. However, because of their habit of nesting on inaccessible rocky shores, the photographs of this colony were less impressive than those of the cormorants.

Following the bird pictures, Mr. Garth introduced Mr. Granville Ashcraft of the expedition, who described the birds collected on the trip and showed the skins of the most outstanding species. Those present were invited to inspect the specimens at the close of the program.

The latter part of the program was devoted to a film entitled "Seabourne Treasure", dealing with the dredging and oceanographic work of the Hancock Expeditions and including many interesting microscopic views of marine life. Mr. Garth accompanied the pictures with explanatory remarks regarding the work.

Adjourned.—HILDEGARDE HOWARD, *Secretary.*

NORTHERN DIVISION

AUGUST.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, August 25, 1938, at 8:00 p.m., in Room 2503 Life Sciences Building, Berkeley, with President Emlen in the chair and sixty-two members and guests present. Minutes of the Northern Division for July were read and approved. Names proposed for membership were: Elmo Stevenson, La Grande, Oregon, and Harvey Irvin Fisher, Berkeley, both by Alden H. Miller. Mr. Grinnell reviewed an exceedingly recent book, which he had received only an hour before, "The California Woodpecker and I—a study in comparative zoology; in which are set forth numerous facts and reflections by one of us about both of us," by William E. Ritter.

Field reports were opened by Mr. John Cushing, who had spent three luckless days in fishing at a lake in British Columbia, only to see an Osprey strike the water and rise with a fish in each claw. Mr. Benson matched the fish story with the report of no less than five hummingbirds pursuing a Mourning Dove in Hamilton Gulch, August 25. Mr. Hall added a bit of hummingbird behavior observed in the Snake Mountains, Nevada. A Red-naped Sapsucker was seen to chase a Broad-tailed Hummingbird which had evidently been attracted by the birch sap trickling from a series of perforations 12 feet up on the tree. Mr. Dyer had recently seen a colored motion picture of a Black-chinned Hummingbird eating sap from holes made in a cottonwood by a Red-breasted Sapsucker. He also commented on the great numbers of pheasants killed by automobiles. Fifty-eight dead birds, 37 of them within five miles, were seen by him on the west side highway in the Sacramento Valley, between Williams and Willows.

The principal speaker, Mr. Alden H. Miller, presented a most interesting account of "Isolation and its Effects in the Genus *Junco*." Isolation he characterized as the divining rod for the seeking of new subspecies. However, rather than the cause leading to differentiation of species and subspecies, it must be considered as the factor which preserves differences and makes possible their accumulation over a long period of time. The whole problem of isolation then resolves itself into the effectiveness of conditions which insure breeding of a population with its own kind, even though it may socialize with other groups on the wintering grounds. Among the 21 forms of juncos found in North America and Central America, interbreeding, though it may take place under both natural and experimental conditions, is usually prevented by some degree of isolation. Three principal types were described: (1) Spatial isolation, in which members on one side of a large habitable area are effectively separated from those on the other side by the intervening population pressure; (2) ecological isolation, where an uninhabitable area forms the barrier; (3) psychological barriers, where two forms in the same area seem to breed with their own kind by preference. More perfect cases of isolation are those in which there is never any contact with an outside race. Isolation at one time effective may be broken down by changes in physiographic conditions. At the close of the meeting, Mr. Miller answered questions and demonstrated specimens of some of the types of juncos he had mentioned.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

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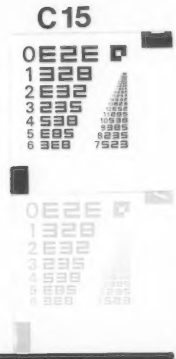
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